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FEBRUARY 1999

The Art of John Singer Sargent

[PAGE 62]

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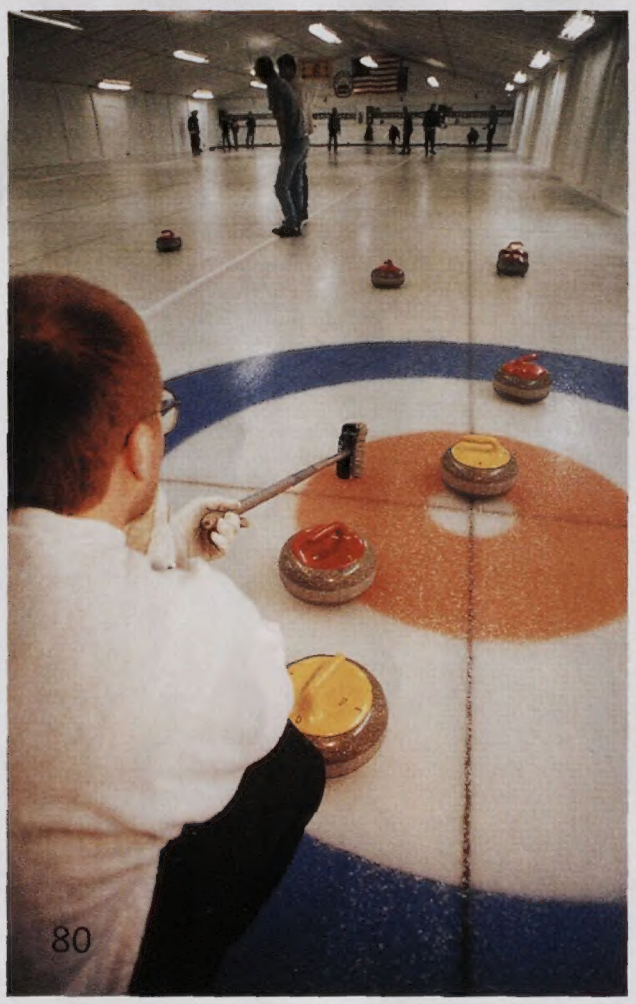

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While Christopher Columbus was sailing around discovering places,

The Island of St. John

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The Wonder of Iron-10

A meteorite was made into magnificent swords, with great difficulty in forging. They were called the Shooting Star Swords.

Messages From Space

By Yoshiyuki Matsuo

In 1890, a lone prospector discovered a lump of iron weighing 22.7 kg in a Japanese mountain range, a rock which is now on display at the National Science Museum in Tokyo. Several years after discovery, scientists learned it was an iron meteorite, so called because many meteorites have large iron contents.

However, about a quarter of the celestial rock has been cut out because a Japanese politician, Takeaki Enomoto, Foreign Affairs Minister at the time, bought the meteorite. He was particularly fascinated by the "iron from the stars." He had the iron meteorite made into a sword to present to the Crown Prince, later to become Emperor Taisho.

Although the meteorite was 89.5% iron, it also contained 9% nickel, and traces of cobalt, copper, tin, phosphorus, sulfur, and carbon, which made it very difficult to work with. Forging by folding it over and over did not go well. Forging had to be carried out after heating the sword white hot.

One long sword and two short swords were made by the process, and despite the difficulties, the steel from the meteorite had a magnificent finish, the pattern on the blade resembling knots in a piece of wood. Enomoto named these swords the *Shooting Star Swords* when he received them from the swordsmith, Kunimune Okayoshi, in 1898. He donated the long sword to Emperor Taisho. The Enomoto family kept the two short swords.

Meteorites retain the form they had at the time of the birth of the sun, and scientists continue to decode the messages that they bring about the creation of the earth.

About the Author:
Yoshiyuki Matsuo is a senior editor for Nikkei Science, *the Japanese version of* Scientific American. *His special interests in material science include quasicrystals, C_{60}, and superconductors.*

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SMITHSONIAN PERSPECTIVES

Saving Our Treasures

A DEVOTED KEEPER OF THE PAST, THE NATIONAL MUSEUM OF AMERICAN HISTORY LOOKS AHEAD TO THE MILLENNIUM

THE NATIONAL MUSEUM OF AMERICAN HISTORY (NMAH) opened its doors to the public in 1964 as the Museum of History and Technology to house the venerable collection that had been on view in the Arts and Industries Building. The more appropriate name was chosen in 1980, and today the museum is one of the world's most exciting and visited exhibit halls—a place to go to understand what it means to be an American. It is home to icons that embody our nation's history—unique treasures such as the original Star-Spangled Banner, the lap desk upon which Thomas Jefferson drafted the Declaration of Independence, and the compass that Lewis and Clark used to guide them in their explorations. Its collections also include objects of everyday life, such as a ceramic teapot used by African slaves and a work bell from the Pecos Pueblo in New Mexico. The museum has more than three million artifacts that illustrate American culture—its innovative spirit, its diversity and its singularity.

NMAH's mission is grounded in its special role as public historian. Through rigorous scholarly research of historical objects, the museum helps visitors evaluate the past to better understand the challenges of the future. These objects hold a unique power to illuminate ideas, memories and details of the lives of individuals and communities. Collectively they say much about the ordinary people and the leaders who created this extraordinary nation. Through its exhibitions, the museum provides a context for understanding their stories.

As a result of an intensive strategic planning process, the museum is embarking on its Blueprint for the Future—a series of changes aimed at improving the educational experience for all of its audiences. New exhibitions, outreach, hands-on learning, collections preservation and accessibility, and focused research will continue to provide quality experiences for visitors, take the museum to wider audiences through the use of new technology, and improve its methods of preserving and building the collections that document our country's history.

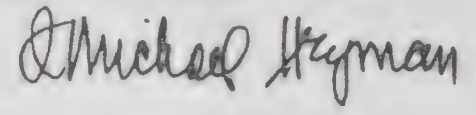
Future plans include the creation of a Welcome Center and an exhibition, "American Legacies," that will help visitors understand and interpret history through the museum's collections. Modern technology provides greater opportunities for making NMAH accessible to people around the globe. Whether you visit the museum in Washington, D.C. or dial in from a computer in a classroom in rural Alaska, you will be able to make connections between objects, moments in history, and the individuals that helped shape our nation.

At the center of the museum's enhancement effort is the landmark Star-Spangled Banner Preservation project. The 185-year-old flag, which inspired the writing of our national anthem, begins a three-year preservation process. Visitors will be allowed to view firsthand the ongoing conservation work in a state-of-the-art laboratory.

Projects such as this are vital to the conservation of our precious national heritage and are largely made possible by generous donors. Polo Ralph Lauren led the way by recently pledging $10 million to the flag preservation project. The Pew Charitable Trusts and the John S. and James L. Knight Foundation—along with other individuals, foundations and associations—also have contributed significantly to this project. To help us share the flag's story with a wider audience, the History Channel is producing films, classroom learning materials and other educational programs about the banner's history and conservation.

Other donations have enhanced the ability of the museum to meet its expanding mission. The Board of the National Museum of American History continually provides financial and other resources, as well as advice and support, for the museum's important objectives. In 1995, the generous gift of the Jerome and Dorothy Lemelson Foundation established the Lemelson Center, which provides a wide range of research and educational activities for schoolchildren and families.

With the support of donors such as these, the National Museum of American History embarks on its journey to raise $100 million to preserve and share today's treasures for tomorrow. The new millennium is a time for exciting discoveries and renewed appreciation for our history and our heritage. Ensuring access to these treasures can only be achieved by the continued support of the private sector.



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THE OBJECT AT HAND

THE COLUMN BY PAULETTE DININNY, in the December issue, about Zippo lighters and their lifetime warranties reminded me of the days when I worked for a wholesale jeweler.

A dealer once sent us a Zippo that looked like it had been shot out of a cannon. What a mess. We forwarded the lighter to Zippo, and they replaced it. On the "no charge" invoice, someone had written: "We are curious. What happened to the lighter you sent to us?"

William Powell pulls out his Zippo for sultry Shelley Winters in *Take One False Step*.

Eventually we got a card from the Zippo's owner, a cowboy in eastern Oregon, that explained simply: "My horse stepped on it."

Bob Gerlach
Portland, Oregon

DURING MY MILITARY CAREER AS A pilot I was stationed in South America and was required to attend the jungle survival school. We were taught many lifesaving techniques, including living off the land. Successful fishing for breakfast, lunch and dinner was an important aspect of surviving in the jungle, and since fish are difficult to catch with your bare hands or with a homemade spear, our instructor suggested that each of us construct and carry a tiny personal survival kit, made from a travel soap box, in which we carried several fishhooks and a length of nylon fishing line.

The sergeant said that while fish can be eaten raw, they taste better cooked, and he recommended the latest Zippo with the internal hinge. We enclosed several flints in the cotton at the base of the lighter and then filled it with gasoline. We then wrapped black electrician's tape around the line where the flip-top and the base meet, to make sure the lighter was airtight. I carried mine for a few years while flying over the jungle, but I never had to use it.

Twenty-five years later, after returning to civilian life, I rediscovered my little jungle survival kit. I removed the tape from the Zippo, opened the hinged top and thumbed the wheel. The flame came up two inches high on the first "thumb."

Robert G. Bjoring
Menlo Park, California

DURING WORLD WAR II, THE MOST coveted item a demolition man in an engineer combat battalion had was a Zippo lighter. In our training, we were taught to split the end of the time fuse that led to the explosives and place a broken match in the slit. We would light the match head with another match so it would flare up and light the fuse. This didn't always work. Sometimes the matches were damp, and sometimes the wind blew out the flame. The Zippo, however, never failed.

We received our first Zippos after D-Day at Normandy, but there were too few of them among our rations. Demolition men bartered and cajoled to get their hands on one of these "black beauties," and I'm sure that many an Axis pillbox, bridge and fortification was reduced to rubble with the help of this treasured lighter.

Alfred Eigenberg
Windcrest, Texas

WHEN I WAS IN VIETNAM IN 1968, the U.S. Army and Navy were working together to create the Mobile Riverine Force in the Mekong Delta. The Navy operated several types of boats as part of this force, and each boat had a hull number preceded by an identifying alphabetic character. One type of patrol boat was designated with an *A* and was called an "Alpha" boat. The hull number for troop-carrying boats began with a *T;* the craft were called "Tango" boats.

Another type of boat carried a flamethrower that could shoot a stream of burning liquid several hundred yards. These boats had hull numbers that began with *Z,* but curiously they were not called "Zulu" boats as the logic of the military alphabet would dictate. Instead, for obvious reasons they were called "Zippo" boats. One day as I was riding in a Tango, a fellow grunt, waving a cigarette in the air, yelled over to the crew of a Zippo: "Hey! Ya gotta light?"

Peter Hayden
St. Louis, Missouri

WHEN MY SISTER AND I TRAVELED TO Vietnam in 1993, we toured the Cu Chi tunnel system. As we emerged, vendors were selling Zippo lighters that had once belonged to our troops. Some had words scratched on them; others carried military insignias. In Danang, one of the streets was lined with display cases showing nothing but Zippos and high school and college rings. It impressed upon me the

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ubiquity of Zippo lighters and the sadness of war.

Elise Dereni Patkotak
Barrow, Alaska

CHARLES PONZI

MARY DARBY'S ARTICLE ABOUT FAMED swindler Charles Ponzi, whose modus operandi was to shuffle money from new investors to old ones, pointed out how easily people will allow greed and wishful thinking to short-circuit common sense. She also noted that consumers seeking reassurances about such schemes often become angry at experts who warn of the dangers. Actually, this reaction is not at all unusual. It is prevalent among many of the participants in what may be the grandest and the longest lived of all Ponzi schemes: Social Security.

Edward G. Koran
Phoenix, Arizona

ASTRONOMICAL TOURIST

NOTWITHSTANDING THE ASSERTION by David DeVoss ("In Arizona, It's an All-Night Party for the Stars") that there are "no amateur biochemists or freelance physicists," I have been advocating the value of freelance physicists for decades. I still encourage those who value independence to take my advice.

In the 1940s, in a California garage, Edward Pickels pioneered the Spinco analytical ultracentrifuge that gave biochemists the world over an enormously powerful tool for life-sciences research. And Albert Einstein was a technical expert in the Swiss patent office while conducting his pioneering physics research without institutional support. Many others could do the same today.

Nature is and should be a laboratory that is open to everyone—loners as well as team players; amateurs as well as professionals.

Lawrence Cranberg
Consulting Physicist
Austin, Texas

COOTS

THANKS SO MUCH TO KENNETH BROWer and photographer Michael Sewell for their great article about coots. The coots' awkward takeoff is matched by their equally comical struggle with locomotion over dry land.

My wife and I first identified these birds in a marshy area of northeastern Indiana as they stumbled along the shores. I remembered an elderly gentleman from my childhood who used to walk by my house with his head thrust forward and hands in his pockets, traveling splay-footed with an uneven waddle that made it seem likely that he might at any moment fall forward on his face. The neighborhood children all called him "the old coot."

As a member of the aging, I now recognize the practicality of that splay-footed waddle, especially when I must traipse over icy or uneven ground. I feel a much closer kinship to what I used to call "just a coot."

Jim Bower
Richmond, Indiana

THE ARTICLE ON COOTS WAS VERY informative, very amusing and pure delight. It shed entirely new light on these ubiquitous birds. Now, if anyone tells me I'm crazy as a coot, I'll thank them for the compliment.

Priscilla Nesbitt
Carmel, California

BUFFALO SOLDIERS

IN HIS DETAILED AND VERY INTEResting article on the great African-American 9th and 10th cavalries of the Old West's Regular Army, T. J. Stiles did not mention John J. Pershing, who served with the 10th Cavalry. During his stint with the Buffalo Soldiers in the 1890s, white officers derisively nicknamed him "Black Jack."

Milton N. Adams
Virginia Beach, Virginia

Long before he successfully led the American Expeditionary Force in Europe during World War I, "Black Jack" Pershing had a distinguished career serving with the 10th Cavalry. Their 1898 mission in Cuba, during the Spanish-American War, was to seize Santiago by taking San Juan Hill while Teddy Roosevelt and his Rough Riders took Kettle Hill. The once-scornful name "Black Jack" came to signify his stern deportment and rigid discipline. Ed.

PHENOMENA, COMMENT & NOTES

THE EXCELLENT COLUMN BY JOHN P. Wiley, Jr., was of great interest to me as I am the vice president of the Izaak Walton League of America. I wish more people shared his respect for our natural world and its resources. We teach and practice conservation, and we promote the preservation of resources to provide for future generations. Our policy advocates control of population so that the world's resources can sustain a livable environment for all people.

Donald L. Ferris
Hamilton, Ohio

WILEY LOOKS FOR THE APPROPRIATE words to describe people who respect the environment. He also wrote that he is "very happy that cardiac surgeons learned their coronary bypass skills on dogs rather than people." Experimenting on creatures who are unable to articulate their pain is not respect for nature.

Gerald K. Adams
Friendship, Maine

Mr. Wiley is goofy about dogs. Ed.

WRITE TO SMITHSONIAN

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PHENOMENA

COMMENT & NOTES

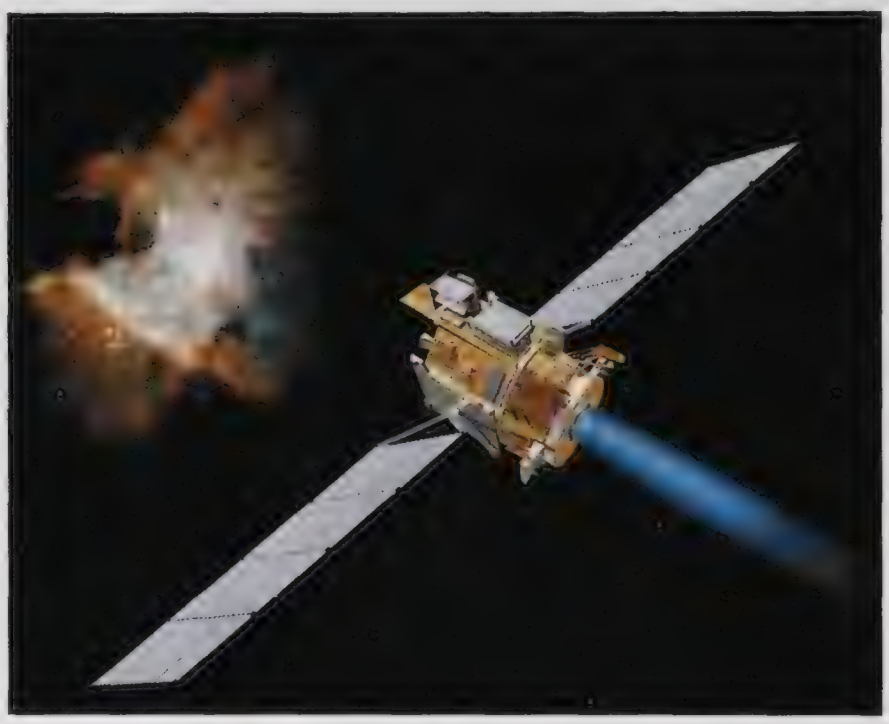
View from the Cockpit

IT'S A FAST AND FURIOUS TIME IN SCIENCE AND TECHNOLOGY, AND A MAN WHO KNOWS PROMISES ONLY MORE OF THE SAME

BY JOHN P. WILEY, JR.

TRYING TO KEEP UP WITH SCIENCE IS, I CONCLUDE after watching openmouthed at an air show, like flying an F-18 at 700 miles an hour just 200 feet above the ground. The landscape is coming at you so fast, I assume, that you don't dare blink, much less sneeze. My desk is a little like that streaking landscape: so much is happening in science that I don't dare look away. The weekly science journals pile up, as do the news releases delivered by mail, electronic or snail. There are Websites such as EurekAlert! to check; tip sheets; alerts from scientist friends, unofficial contributing editors and writers; and the daily papers.

Some of the news makes the front page, like the wholesale cloning of farm animals or the first steps toward growing cells that can reverse what had been irreversible damage in humans. Some of it does not make the front page, but it represents fundamental changes in the way science sees the world. Take the neutrino, for example, the "little neutral one," a subatomic particle that fills the universe and routinely passes through the entire Earth (not to mention us) without touching anything. Since its existence was first predicted and then discovered, the neutrino has been treated as if it did not have any mass.



Deep Space 1, the first spacecraft to rely solely on an ion engine, a dream of science fiction, soars past a generic nebula.

Now comes evidence from 3,000 feet down in a zinc mine 125 miles from Tokyo that, yes, neutrinos do have mass. Not much, to be sure, but there are so many neutrinos that the sum total of their mass would be an impressive, if incomprehensible, figure.

How about antigravity, a favorite of science fiction writers for decades? Well, some such force is at work in our universe, causing it to expand faster than would be expected. Astronomers study supernovas in distant galaxies in the hope of using them as "standard candles." If such stellar explosions of particular kinds produce certain absolute luminosities, then we can judge how far away they are by how bright they appear. Applying the resultant rules of thumb to the most distant galaxies, however, astronomers found those galaxies were farther away than they should have been. Some unknown repulsive force is counteracting the gravitational field of the entire universe. Brian Schmidt, the Australian astronomer who heads one of the two teams investigating the matter, was quoted as saying: "My own reaction is somewhere between amazement and horror."

Many years ago Einstein incorporated a "cosmological constant" into the equations he used to describe gravity, together forming a theory we know as the general theory of relativity. Einstein used the constant to correct what he considered a flaw in his work; without it, the equations seemed to say, the universe would collapse under its own weight or expand forever. At the time, there was no observational evidence for such a constant, and later he called it his greatest mistake. Now it turns out he was right on the money. The unknown form of energy that is accelerating the expansion of the universe, a kind of negative gravitational force, works exactly like Einstein's makeshift constant. The discovery has been named "Breakthrough of the Year" by *Science*, a publication of the American Association for the Advancement of Science. It is not just a matter of distant galaxies being 10 to 15 percent farther away than our calculations had predicted. The discovery apparently means that the newly detected force may constitute more than half of the energy in the universe, which in turn means that the theorists have their work cut out for them.

Then there are stories that never see a front page. Radio

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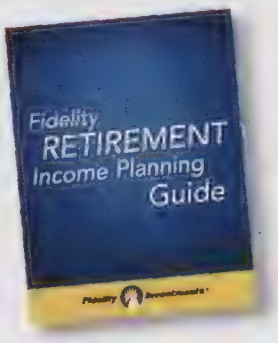

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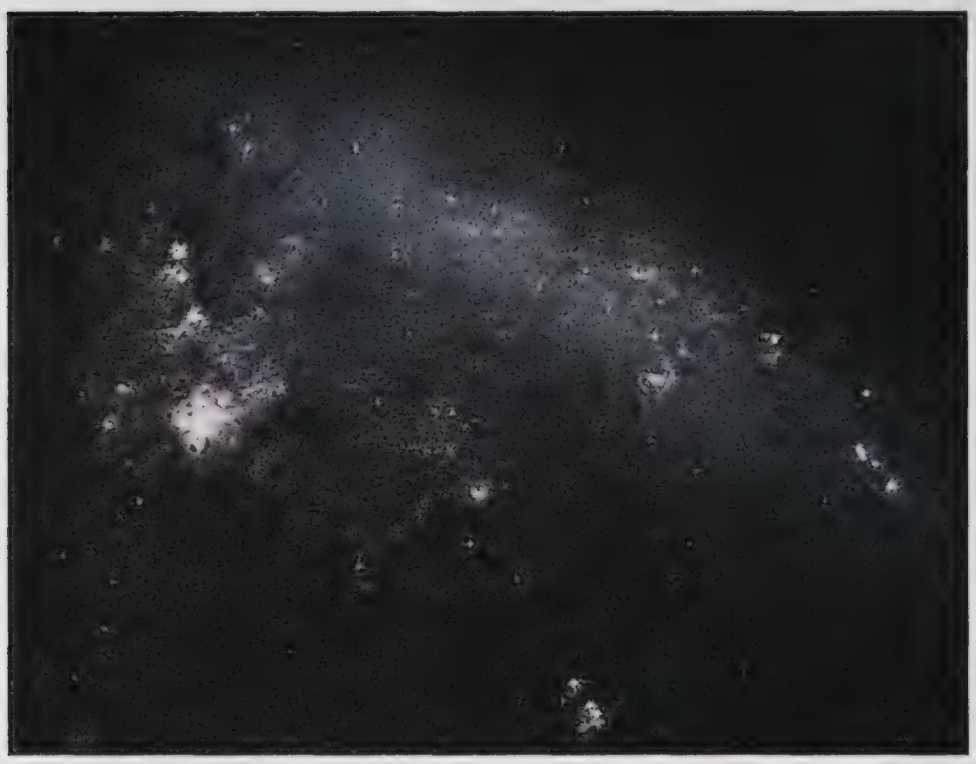
Cosmologists, like "kidnap victims," try to learn where they are "from the chinks of light that reach them through their blindfolds."

astronomers announced at a meeting in Australia that they had captured images of streams of hydrogen that our home Milky Way galaxy is sucking out of two satellite galaxies, the Large and Small Magellanic Clouds (naked-eye objects in the Southern Hemisphere sky). The whole thing works like tides on Earth. Our galaxy's gravitational effect on the Magellanic Clouds is strongest on the parts closest to us. That actually pulls some of the gas away. The gravitational effect on hydrogen on the far side of the clouds is less than its effect on the main bodies of the clouds, so the main bodies are pulled away from that gas. The two clouds end up with streams of gas being left behind them and an arm reaching ahead of them, curving all the way to us here in the much larger Milky Way.

Even less attention was paid to "blinkers" on the surface of the sun, small explosions that occur sporadically on every part of the sun. A press release from the Royal



The Large Magellanic Cloud is a small galaxy with not much of a future; it is being slowly devoured by our Milky Way galaxy.

Astronomical Society called them insignificant because they were small and had only one-millionth as much energy as a solar flare. Each explosion, however, is about the size of Earth. The blinkers could help explain how the sun produces the solar wind, the stream of charged particles that constantly blow outward from the sun's surface.

On the technology front, another staple of science fiction has come to life. A spacecraft called *Deep Space 1* is heading out from Earth on a test flight that will take it by a small asteroid in July. It does not burn rocket fuel to create thrust. Instead, it uses electricity supplied by solar panels to strip electrons from xenon atoms, making them electrically charged particles known as ions, and then it uses more electricity to push them out of the engine so fast that they create thrust. The *New York Times* reported that the thrust so generated would have the force of one sheet of typing paper pressing down on your hand. The secret is time, though. That laughably small amount of thrust is expected to add 8,000 miles an hour to the velocity of *Deep Space 1* by the end of the mission, currently planned for September 1999.

Now if a person had a reasonable expectation that things would slow down, that sooner or later we would have time to catch our breath, it wouldn't be so bad. Unfortunately, it looks like the future holds more of the same, only more so. A man named John Maddox was for nearly 23 years the editor of *Nature*, a weekly journal that publishes both original research and science news. He had first-hand knowledge of what was happening, especially in astronomy and molecular biology. He is retired (and is now Sir John) and has written a book called *What Remains To Be Discovered*. It is a long book, and dense, so rich that it is best approached like pâté de foie gras, to be ingested in small quantities.

Maddox believes that science is not quite as far along as is sometimes thought. Some of the questions he raises, he writes, "cry out for answers. The nature of the hidden mass in apparently ordinary galaxies is a deepening embarrassment as the decades tick by. On the other hand, the search for 'missing mass' to close the Universe [make it eventually stop expanding and collapse in on itself] seems destined to be a wild-goose chase. The origin of the energetic particles in cosmic rays, a fashionable object of study three or four decades ago, remains enigmatic. The role of magnetism in the structure of galaxies and perhaps of the Universe at large is another issue that cosmology has put aside for the time being."

Maddox is less than convinced of either the Big Bang or black holes. "Observers of the heavens have been like kidnap victims seeking to learn where they are," he says, "from the chinks of light that reach them through the imperfections of their blindfolds; half a century from now, cosmologists will have a much better idea of what kind of Universe they are expected to explain."

Fifty years isn't much from the universe's point of view. Without saying the M word, let's think in larger units. Think of how far astronomy has come in the past 1,000 years. (For a clue as to where some of the centers of astronomy might have been 1,000 years ago, consider how many stars have names derived from Arabic: Aldebaran, Rigel, Altair, Deneb . . .) So, how far will it go in the next 1,000? Or 10,000? And how fast will the F-3712 be flying?

PHOTO RESEARCHERS

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Pictures of a Tragedy

IN 1901 RUDOLF EICKEMEYER, JR., PHOTOGRAPHED EVELYN NESBIT; SCANDAL AND MURDER WERE HER BEAUTY'S PRICE

BY EDWARDS PARK

Exhausted from posing for Eickemeyer, Evelyn Nesbit subsided on a bearskin rug. The resulting image, *Tired Butterfly*, became his most famous photograph.

A BEAUTIFUL GIRL IS OUR OBJECT—not in person (regretfully), but in 31 remarkable photographs taken at the very beginning of this soon-to-pass century by celebrated portrait photographer Rudolf Eickemeyer, Jr. Appropriately, she is a model and what used to be called a showgirl. Appropriately, too, though she deserves to be famous for her beauty, like Helen of Troy she is famous for a scandal, and ensuing tragedy. The scandal rocked old New York society to its foundations, and like all such scandals, even today, its story is a morality tale.

The year was 1901. Lovely Evelyn Nesbit, a Pittsburgh lass of 16, along with her widowed mother and younger brother, had come to New York to seek her fortune. With her beauty, the best way to start was by getting a job as an artist's model. Soon she was posing for Frederick S. Church, a prominent magazine illustrator. She found him to be a dear, fatherly old man who used red wine instead of vinegar to prepare the luncheon salad he served her à deux in his studio. Next, Charles Dana Gibson, famed for his "Gibson Girl," sketched Evelyn with her hair streaming down to form a question mark. He called it *The Eternal Question*.

And so success found Evelyn Nesbit. She opened on Broadway as one of the "Florodora" girls. The eponymous musical was famous for a sextet of beautiful women, serenaded by frock-coated choristers: "Prithee tell me pretty maiden, are there any more at home like you?" There followed a properly coquettish reply from the maidens: "There are a few, kind sir, but simple girls and proper, too." Top-hatted stage-door Johnnies took note of the new girl, who was picked up by her mother every evening after the show. The stage-door Johnny who got to see more and more of her was Stanford "Stanny" White, architect not only of many important New York buildings but also of the city's attitude toward unabashed free-living for those who were rich enough to afford it. White, a tall man with short red hair and wide red mustache, was as much a New York landmark as the splendid sports garden he designed at Madison Square. His reputation as a charming roué was equally a city fixture. One of Miss Nesbit's elderly and wealthy admirers was shocked by her interest in White. "A voluptuary!" he snorted. Nevertheless, the innocent Evelyn went along with Stanny to one of his convenient hideaways, where champagne flowed and the curtains were always drawn. She rode high in a red velvet swing he had installed. He plied her with drink, and she passed out. After Evelyn came to, White is supposed to have gloated, "Now you belong to me!"

Being the girlfriend of Stanford White lifted Evelyn from modest fame to rib-nudging notoriety, from barely genteel poverty to spendthrift affluence. And the Nesbits sudden-

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ly moved to a plush hotel. Brother Howard was bustled off to a military academy. But White, who had an insatiable yen for adolescent girls, also had a limited attention span. When he left on a trip, stage-door Johnnies jostled for the chance to escort Evelyn home. For a time, the lucky guy was a young man named John Barrymore.

But (*hiss, groan*) enter Harry K. Thaw of Pittsburgh. That's how this mad millionaire always introduced himself to the New York showgirls whom he relentlessly pursued. Harry K.'s Pittsburgh had little in common with the Nesbits'. Harry's father was a coal and railroad baron and dwelt in a hillside castle far from the hellish clamor of the great mills that had been neighbors to the Nesbits. As a child, Evelyn was doubtless hustled out of the way of a gleaming coach with matched horses, whispering wheels, dim figures behind drawn curtains—"Look out, dear! Here come the Thaws!" And now she found herself going out with one of them.

An odd one he was, too. Harry K. was known for wide swings of personality, from kind and gentle to beastly cruel. Showgirls whispered about colleagues whom he was supposed to have lashed with a dog whip. But he was rich beyond imagining, and he kept begging Evelyn ("The Kid" to fellow chorus girls) to give up her faltering liaison with Stanford White, who had a wife, for heaven's sake, and marry a man who had nothing but millions of dollars.

For a while Evelyn held Harry at bay. White, meanwhile, arranged her entrée into a New Jersey boarding school, where she studied music and literature. The school was run by Mrs. Mathilda De Mille, whose own son, 20-odd-year-old Cecil B., was off to try his hand in motion pictures. But Thaw deluged her with flowers, gifts and marriage proposals. After only eight months at the school, Evelyn had to undergo an operation for "appendicitis." Both White and Thaw visited her every day of her recuperation but, despising each other, managed not to meet.

Afterward it was Thaw who took Evelyn and her mother abroad, where he spent a great deal of money on Evelyn. Alas, she soon found that the nasty rumors about him were all too true. He was very sweet a lot of the time, but suddenly would grow tense, with his prominent eyes blazing wildly. If a restaurant waiter displeased him, he sometimes snatched off the tablecloth, sending everything on it crashing to the floor, or even turned the table upside down. Mrs. Nesbit, feeling that even the Thaw millions didn't excuse such behavior, headed home, leaving Evelyn to cope with Harry K. He was an ardent lover. After fits of rage he would coo extravagant apologies to "her boofuls," but if she became "impudent," she later said, he whipped her, impervious to her screams and sobs.

Finally Thaw got out of Evelyn the full story of her affair with White. He raged, pacing and fuming as he made her repeat again and again the details of her "seduction" by "that beast." When they returned to America he approached the New York Society for the Suppression of Vice and persuaded its president, the celebrated moralist Anthony Comstock, to put a tail on White.

In June 1904, Evelyn, now 19, went off to Europe again, again with Harry K. Thaw. In early 1905, after their return, she was smitten by a medical anomaly—a second attack of appendicitis. After six weeks in the hospital, where Harry smothered her with attention, she felt well enough to marry him. This astonishing decision seems to have been mostly the work of Harry's mother, who had decided that his settling down with Evelyn was the only way to keep him out of trouble. They married on April 4, 1905. Mrs. Nesbit got a wedding gift of $100,000. On pain of being cut off without a penny by his mother,

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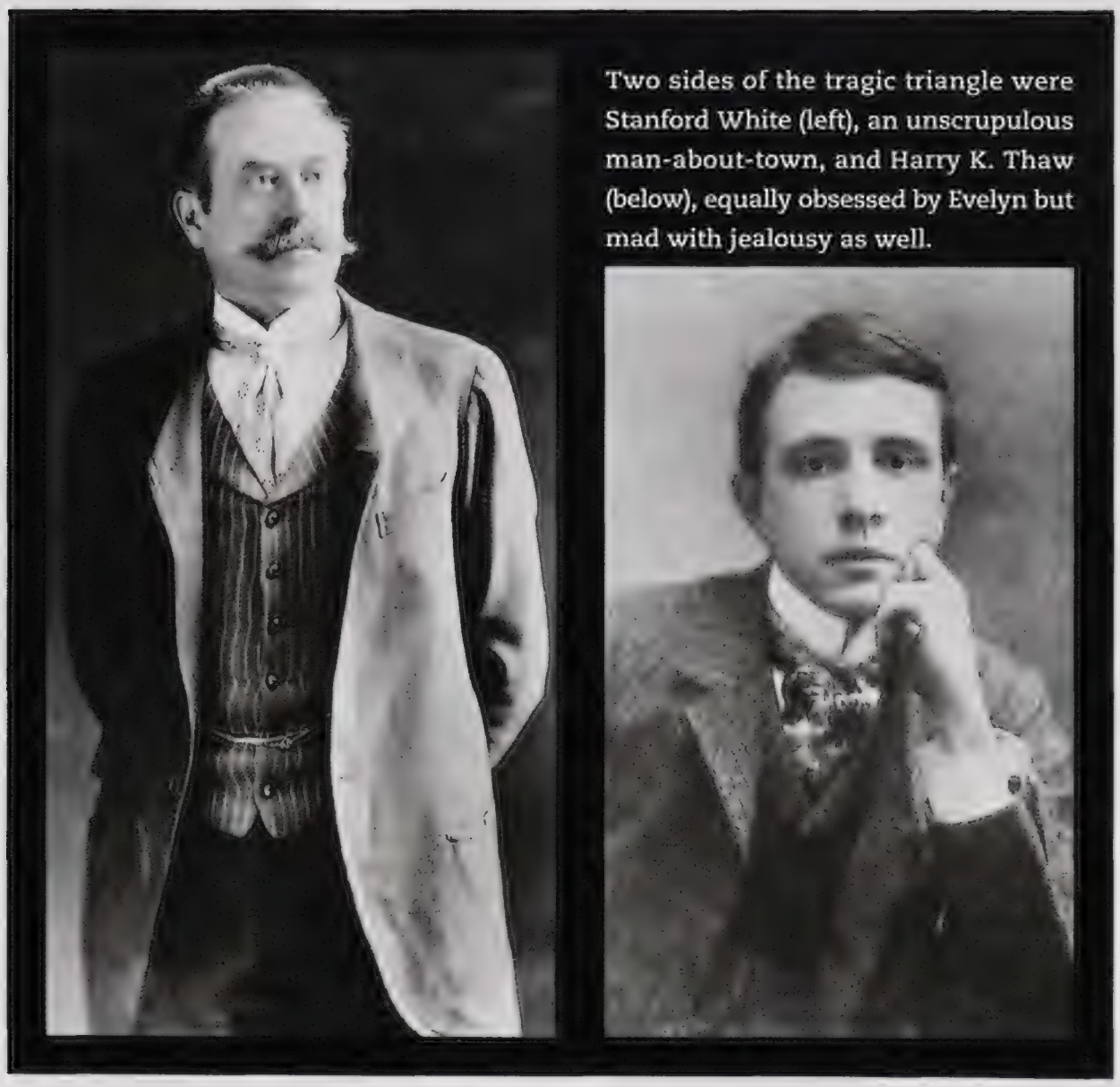
Harry behaved himself for a while.

Thaw, whose outrage at White grew constantly, had begun carrying a pistol. On the evening of June 25, 1906, Evelyn and Harry spotted him in a restaurant, and Harry's fury broke out anew. Later that evening, he and Evelyn went to Madison Square Garden's roof theater to see *Mamzelle Champagne*, and by mischance White was also in the audience. Despite the warm June night, Thaw had on a black overcoat. As he was leaving the show, and while the chorus girls were in their finale—a burlesqued dueling number—he suddenly turned back, approached White's table, drew the pistol from under his coat and, at a range of about a yard, aimed between White's eyes. While the music played on, and the girls pranced about with fake épées, and the smiling crowd was about to applaud, Harry K. Thaw of Pittsburgh fired three times. Thinking it all part of the show, someone laughed. Then the screams started, among them Evelyn's: "My God! He's shot him!"

Trial of the century? Well, one of them, anyway. Two trials, really; the first ended in a deadlocked jury. At the end of the second, Harry K. went off to the Asylum for the Criminal Insane at Matteawan, not far from Poughkeepsie, where, according to Evelyn, "he enjoyed virtual freedom." His lawyers battled for new hearings, gaining little but huge fees from Harry's mother. In 1913 he simply walked out of the asylum gates, climbed into a waiting car and was driven over the border to Sherbrooke, Quebec, where crowds lined the streets to cheer him. Extradited, he got similar adulation as he passed through Concord, New Hampshire.

Two years later, another trial found him sane. Instantly, he divorced Evelyn and moved back to Pittsburgh. He continued his wastrel life—a series of nightclub brawls, outrageous affairs, lawsuits and expensive settlements—until his death in 1947 from a heart attack.



Two sides of the tragic triangle were Stanford White (left), an unscrupulous man-about-town, and Harry K. Thaw (below), equally obsessed by Evelyn but mad with jealousy as well.

Thaw's mother had promised Evelyn a million dollars if she would divorce Harry after beefing up his initial defense by adding testimony about his irrational behavior. Evelyn complied. Whenever she entered the courthouse, adoring crowds gathered to see her. Irvin S. Cobb, whose writings remained popular through the 1930s, covered the New York trials for his paper and described her as "the most exquisitely lovely human being I ever looked at." But she never got that million-dollar payoff.

The photographs that let us see what Thaw and White were fighting over are among the best known ever made by Rudolf Eickemeyer, Jr., who as a photographer was remarkable at landscapes as well as portraits. He took these in 1901-02 at the behest of Stanford White. At one point in a long photo session, Evelyn wearily flung herself onto a polar bear rug. "Hold that!" cried Eickemeyer—and he made his most famous picture, *Tired Butterfly*.

After the Thaw scandal, the tired butterfly had to live by her wits again, taking stage and film parts, struggling out of a maze of drugs and alcohol. She died in 1967 in a Hollywood nursing home, having lived long enough to see the film *The Girl in the Red Velvet Swing* (1955), starring Joan Collins as Evelyn, Ray Milland as Stanford White, and Farley Granger in the role of madly jealous Harry K. Thaw. In his will, Eickemeyer left many of his pictures to the Smithsonian. They are on display from time to time and are kept in the Photographic History Collection of the National Museum of American History. Using a number of different processes in the printing of his film, he noted that the pictures should "be of real educational value." They certainly are, but not entirely in the way Eickemeyer intended.

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BY MICHAEL KERNAN

IN LATE 1961 THE CIVIL RIGHTS MOVEMENT BURST upon the scene in Albany, Georgia, as that town's African-American population galvanized to stand against segregation. A mass meeting at the Mount Zion Baptist Church was packed with people, from student activists to comfortable, middle-aged conservatives.

Cordell Reagon, an 18-year-old organizer for the Student Nonviolent Coordinating Committee, had discovered many talented singers in the SNCC workshops held in that community, among them Bernice Johnson and Rutha Harris, preachers' daughters studying voice at Albany State College.

Reagon, Johnson and Harris were part of a small group of vocalists who led the singing in mass rallies, and that night, along with 500 others, they exploded in song.

Working without piano or any other accompaniment, the singers took the roof off the church. Everyone sang, everyone cried, the whole group swayed to the closing song, "We Shall Overcome," and people stayed on after midnight, wanting never to leave. It was one of the great moments in the American struggle for racial justice.

Her work in the movement was also a defining period in the career of Bernice Johnson Reagon, who eventually abandoned her plans for a career in classical music to work with a group called the Freedom Singers, founded by Cordell Reagon, whom she later married. She simultaneously pursued a solo career, making her first solo recording at age 19.

Bernice Reagon went on to found important musical groups herself, including the Harambee Singers in 1966 and the world-famous women's a cappella group Sweet Honey In The Rock in 1973. Along the way she picked up a doctorate in American history, a distinguished professorship at American University in Washington, D.C., the title of curator emeritus at the National Museum of American History, and a MacArthur "genius" grant.

Sitting with her in her small, book-crammed office at the university, I asked her about the fact that there were no instruments at that performance in Albany, just the power of the human voice.

"It's funny, I never thought about my singing there as being public," Reagon reflected. "I sang in my high school choir, college choir and the gospel choir of my church. I was an alto. And then singing in the movement rallies, in jail and in the church, it was just sort of continuing what I'd been doing. I didn't think of it as a performance."

Scholar, vocalist, composer, Bernice Reagon plays the *shekere*, an African percussion instrument.

SHARON FARMER

As for the piano, it was never something that she could take for granted. "They didn't have a piano in my church till I was 11," she explained. "There was no piano in the school I went to. The SNCC workshop would be in the basement of a church: no piano. Now, if you went to the Selma campaign there would be a piano and a gospel choir, and they would tape the mass meetings. In Birmingham they had not only a piano but a Hammond organ. But in our community it was always a cappella. It's interesting to me how the different communities established their own aesthetic. Also, I just feel more comfortable with the plain voice."

Another great insight from those days was that, though the movement started with the students, older people soon joined in.

"On my first march in Albany, from the college, it was all students," she said. "By the third march—when I was arrested—there were as many adults as students. The action became broader, and the songs, too. We would do our swinging freedom songs, but we'd also do old

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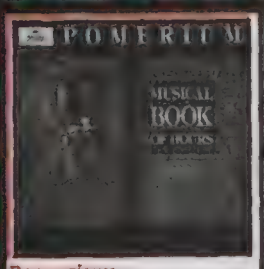

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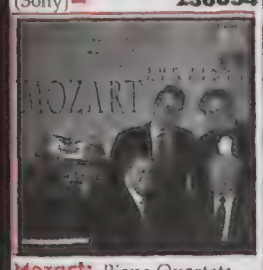

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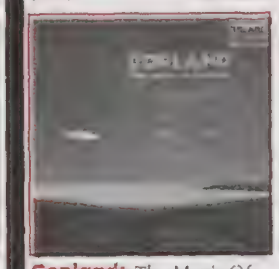

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There are five singers in Sweet Honey, producing a sophisticated sound that is far more complex than the conventional quartet.

19th-century lined hymns. When the SNCC people came to town they found that the Albany sound was different. They'd heard students sing, but they had never heard black people of all ages sing at that power level. The singing really represented the energy of what we were feeling about going up against those issues in that community. It was such a celebration."

She leaned forward, intense. "When I got out of jail in '61," she began casually, "I went to a mass meeting and I was hoarse because I sang all the time in the jail. I opened my mouth to sing . . . I never heard that voice before. It was very similar to the way people describe religious conversion. There is actually a song that says: 'I looked at my hands, and my hands looked new. I looked at my feet, and they did, too. I started to talk, and I had a new talk. I started to walk, and I had a new walk.' For the first time I really understood what was in that singing that I had heard all my life."

Suspended from Albany State in her junior year for marching with the movement, Bernice Johnson transferred to Spelman College at Atlanta, studied voice and history there, and later got her Ph.D. at Howard University, concentrating in African-American history. While living in Atlanta, she had formed the Harambee Singers, African-American women who "had the energy of black pride," Reagon says. She started writing songs for them.

"Some young men wanted to join, so I asked the group. They thought that if men came in it might be a burden we didn't need. So we stayed a women's group. It was a wonderful experience. The Harambee Singers still exists in Atlanta."

Not that she didn't have a great appreciation for male voices. She had grown up in southwest Georgia, where traditional quartet singing was predominantly male. "It's the quartet harmony sound that really influenced me as an arranger," says Reagon. "When I formed Sweet Honey In The Rock, I knew that it would have not the trio sound mostly associated with female harmony groups, but a quartet sound with a bass singer.

"We had women sing the bass line," she said. "I sang bass though I am a second alto. Three of us took the bottom line alternately."

But the quartet sound was not to last either. In Washington, while she was attending Howard University, she became vocal director of the D.C. Black Repertory Company, founded by actor Robert Hooks. Working with 20 to 30 voices and eight or nine harmony lines made the limitations of three- or four-part harmony unsatisfactory, she says, which led her to the difficult five-part sound of Sweet Honey In The Rock.

Thus, there are five singers in Sweet Honey, producing a sophisticated sound that is far more complex than the conventional quartet. Over the years the personnel has changed, for the singers have always by necessity worked part-time, and some 22 women have been members since the founding in 1973. Sweet Honey has performed in Africa and Canada, but mostly it covers the United States, from Maine to California, with more than 60 concerts a year, usually sold out weeks in advance.

But Sweet Honey is only part of the story. Reagon has a grown son, Kwan, a cook, and a daughter, Toshi, a musician, from her marriage to Cordell, which ended in 1967. She is a specialist in African-American oral history, performance and protest traditions. Her work as a folklorist, scholar and curator at the Smithsonian over the course of 20 years led to studies of African-American family histories and the evolution of the spiritual, and field research in the cultures of eight African nations. In 1989 she got the phone call from the MacArthur people.

"I'd been taping revival meetings in Georgia for three

The members of the a cappella group Sweet Honey In The Rock include, from left: Nitanju Bolade Casel, Aisha Kahlil, Carol Maillard, Bernice Johnson Reagon and Ysaye Maria Barnwell. Shirley Childress Saxton, top right, serves as Sign language interpreter for the ensemble.

DWIGHT CARTER

summers, and I was staying with my mother there," she recalled, "when the phone rings. 'This is Ken Fisher, I'm with the MacArthur Foundation, and you have a MacArthur grant.'"

"I was like, 'Hello?' It was totally out of the blue," Reagon reflected. "I'd heard about the MacArthur and I had asked how you got nominated for one. If you can show me how to get to something, I'll walk it down. But when they said you can't do it yourself, you have to be picked, I just forgot about it."

She used the five-year grant to continue her work in African-American sacred music traditions, which resulted in the 1994 production "Wade in the Water," a 26-hour radio series sponsored by the Smithsonian and National Public Radio. "Wade in the Water," which won the Peabody Award, also led to a show of the same title organized by the Smithsonian Institution Traveling Exhibition Service, a four-CD set of recordings on the Smithsonian Folkways label and the book, *We'll Understand it Better By and By: Pioneering African-American Gospel Composers*, published by Smithsonian Press.

There was also a Charles Frankel Prize, a medal presented by the President in 1995 for her contributions to the public understanding of the humanities, seven honorary doctorates and several other honors.

In 1992 she appeared with Bill Moyers in an hour-long TV production, *The Songs are Free*, nominated for an Emmy. She has also served as music consultant, composer and performer for such projects as the celebrated *Eyes on the Prize* TV series, the Emmy-winning *We Shall Overcome*, and other PBS productions. Most recently she did the sound score for the four-part film series *Africans in America*, which aired initially on public television in October, and is being rebroadcast this month.

Two years ago Reagon won an Isadora Duncan Award for the score of *Rock*, a ballet directed by Alonzo King.

One of her courses at American University is on slavery. I asked about the music of the slaves. I thought it must be sad and heavy stuff.

She gave me a look. "I was working with filmmakers on the *Africans in America* team who wanted slave songs, and they kept saying some of the songs I sent were too upbeat, too jolly. I told them that African-Americans would never have made it through slavery if they'd done only the mournful stuff.

"Think about black people coming to freedom with hope and wanting to know about their children, wife, husband, mother. Four million people who somehow have survived but are stunned because they had to absorb losing so much, who are going on in spite of losing so much, and finding a way to shout despite losing so much. With us laughter and tears are very close together; dancing and moaning are very close together."

She pounded on her thigh, a fast, syncopated rhythm. "Dance! Drumming! It's a sanity thing. Even in a catastrophe, there had to be some time when you would smile and you would laugh. Or you wouldn't survive."

She sang for me: "This is a mean world to live in till you die, without brother, sister, mother, father . . . " Despite the words it was a lilting song, full of joy. "I get audiences to sing along," she informed me. "I tell them even if you lose everybody there is still something in you that says, 'Since I am alive, I will go on.' How do you express that? Here you have it wrapped up in a jumping song. If you told the truth only in the pain and tears, you couldn't stand it for long. You have to have the moans and sadness, but also the shouting and celebration."

"You teach American slavery," she says, "but can you sing it, too? That thought has pushed me as a composer."

You don't have to be afraid of history, she tells her students. You're safe, you're not on the plantation, not in chains, not being whipped. You can study the terrible things of the past without living through them. It is important, she says, to be fluent in history and not hide from it, for this is how healing can take place.

"When you study 19th-century African-American history, you have to study the slave system, but also you have to study the abolitionists, the people who built special rooms in their houses and their wagons to hide fleeing slaves, the people who helped to fight slavery," contends Reagon. "You get one, you get the other. If you teach the full range, you can manage it."

I wanted to know: What if Reagon had to decide between her careers? Performer, teacher, scholar—which career is the most important to her?

"Luckily, I don't have to choose," she said. "If I did, I'd have to look at where I was at that time. But I don't rate the three of them. When I was at the Smithsonian [where she is still curator emeritus at American History], it was very important to me that I was also singing with Sweet Honey In The Rock at the same time. I always had supervisors who supported me, I was always able to name my areas of research. Weekdays I would be in the office, a specialist in my field, very difficult work, studying the origins of African-American culture. But by Saturday I'd be on the stage singing out of that same culture."

She sat back and tried to sum it all up.

"You teach American slavery, but can you sing it, too? That thought has pushed me as a composer, it's taken me into places I would never have gone."

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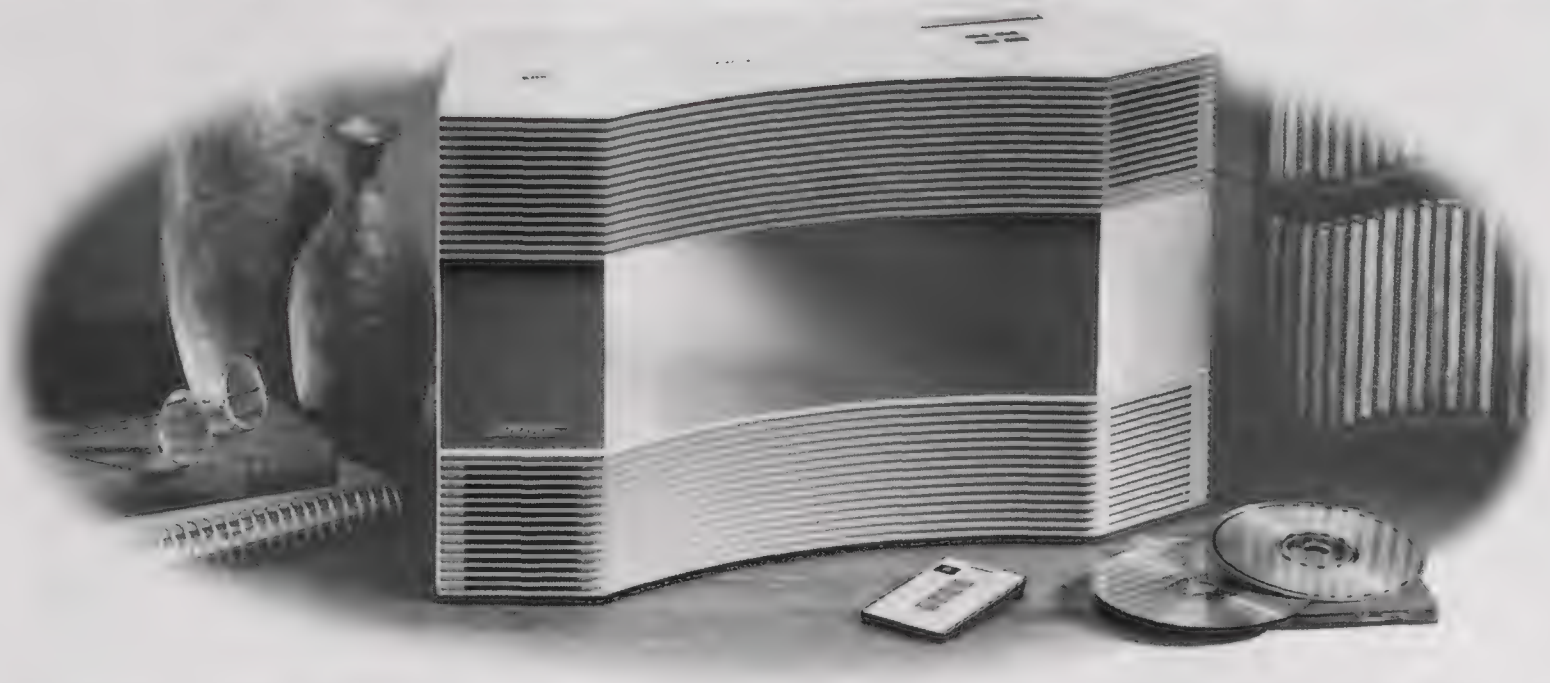

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Quilters and Their Stories

THE "HEALING QUILT," SEWN BY HIS GREAT-great-grandmother, was a comfort to 8-year-old Roland L. Freeman as he lay in a hospital with pneumonia 50 years ago. Now a photojournalist, folklorist and quilt designer, he has for 25 years crisscrossed the country visiting quilters. His book, *A Communion of the Spirits: African-American Quilters, Preservers and Their Stories*, documents the visits, as does a touring exhibition by the same title, on view at the Arts & Industries Building through March 30. Among the 200 photographs are 40 with quilted frames. Adriene Cruz, from Portland, Oregon, and her quilt *Dunumba* (African Rhythm) are pictured above; she also created the frame. "Both works have cowrie shells and the colors of Kente cloth," she explains. "They represent my heritage. For me, they are spiritually significant." —*Bruce Hathaway*

SMITHSONIAN HIGHLIGHTS

The Transderm Scōp® patch is clinically proven to work better than Dramamine®*

Transderm Scōp is more effective and longer lasting than Dramamine**at preventing the nausea and vomiting of motion sickness. Just peel off the backing and press it behind your ear at least four hours before boarding and relax. The medicine is consistently absorbed for up to three days. You can even shower with it. For shorter trips, remove the patch when no longer needed and the effects wear off. ***In clinical studies, 5 out of 6 people did not report drowsiness with Transderm Scōp.***

Ask your doctor about Transderm Scōp when you make your travel plans.
Not for children or those with glaucoma, difficulty in urinating, or an allergy to scopolamine or other belladonna alkaloids. In clinical studies, some side effects were noted, including blurred vision, dryness of the mouth (in two-thirds of users) and drowsiness (reported incidence less than 1 in 6). While using this product, you should not drive, operate dangerous machinery or do other things that require alertness. Avoid using alcohol. If you are elderly, your physician should exercise special care in prescribing this product. See adjoining page for additional information on potential adverse reactions or side effects.
Available by prescription only.

ASK YOUR DOCTOR ABOUT
TRANSDERM SCŌP® *scopolamine 1.5mg*

Call 1-888-670-SCOP www.transdermscop.com

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*Compared to Dramamine dimenhydrinate tablets. ** Based on labeled dosage

Transderm Scōp®
scopolamine 1.5 mg

Transdermal Therapeutic System

Programmed to deliver *in vivo* approximately 1.0 mg of scopolamine over 3 days

Brief Summary
(For full prescribing information, see package insert)

INDICATIONS AND USAGE: Transderm Scōp is indicated for prevention of nausea and vomiting associated with motion sickness in adults. The patch should be applied only to skin in the postauricular area.

CONTRAINDICATIONS: Transderm Scōp is specifically contraindicated in persons who are hypersensitive to the drug scopolamine or to other belladonna alkaloids, or to any ingredient or component in the formulation or delivery system, or in patients with angle-closure (narrow angle) glaucoma.

WARNINGS: Transderm Scōp should not be used in children and should be used with special caution in the elderly. See PRECAUTIONS.

Since drowsiness, disorientation, and confusion may occur with the use of scopolamine, patients should be warned of the possibility and cautioned against engaging in activities that require mental alertness, such as driving a motor vehicle or operating dangerous machinery.

Potentially alarming idiosyncratic reactions may occur with ordinary therapeutic doses of scopolamine.

PRECAUTIONS

General: Scopolamine should be used with caution in patients with pyloric obstruction, or urinary bladder neck obstruction. Caution should be exercised when administering an antiemetic or antimuscarinic drug to patients suspected of having intestinal obstruction.

Transderm Scōp should be used with special caution in the elderly or in individuals with impaired metabolic, liver, or kidney functions, because of the increased likelihood of CNS effects.

Caution should be exercised in patients with a history of seizure or psychosis, since scopolamine can potentially aggravate both disorders.

Information for Patients: Since scopolamine can cause temporary dilation of the pupils and blurred vision if it comes in contact with the eyes, patients should be strongly advised to wash their hands thoroughly with soap and water immediately after handling the patch. In addition, it is important that used patches be disposed of properly to avoid contact with children or pets.

Patients should be advised to remove the patch immediately and contact a physician in the unlikely event that they experience symptoms of acute narrow-angle glaucoma (pain in and reddening of the eyes accompanied by dilated pupils). Patients should also be instructed to remove the patch if they develop any difficulties in urinating.

Patients should be warned against driving a motor vehicle or operating dangerous machinery while wearing the patch. Patients who engage in these activities should also be aware of the possibility of withdrawal symptoms when the patch is removed. Patients who expect to participate in underwater sports should be cautioned regarding the potentially disorienting effects of scopolamine. A patient brochure is available.

Drug Interactions: Scopolamine should be used with care in patients taking drugs, including alcohol, capable of causing CNS effects. Special attention should be given to drugs having anticholinergic properties, e.g., belladonna alkaloids, antihistamines (including meclizine), and antidepressants.

Carcinogenesis, Mutagenesis, Impairment of Fertility: No long-term studies in animals have been performed to evaluate carcinogenic potential. Fertility studies were performed in female rats and revealed no evidence of impaired fertility or harm to the fetus due to scopolamine hydrobromide administered by daily subcutaneous injection. In the highest-dose group (plasma level approximately 500 times the level achieved in humans using a transdermal system), reduced maternal body weights were observed.

Pregnancy Category C: Teratogenic studies were performed in pregnant rats and rabbits with scopolamine hydrobromide administered by daily intravenous injection. No adverse effects were recorded in the rats. In the rabbits, the highest dose (plasma level approximately 100 times the level achieved in humans using a transdermal system) of drug administered had a marginal embryotoxic effect. Transderm Scōp should be used during pregnancy only if the anticipated benefit justifies the potential risk to the fetus.

Nursing Mothers: It is not known whether scopolamine is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when Transderm Scōp is administered to a nursing woman.

Pediatric Use: Children are particularly susceptible to the side effects of belladonna alkaloids. Transderm Scōp should not be used in children because it is not known whether this system will release an amount of scopolamine that could produce serious adverse effects in children.

ADVERSE REACTIONS: The most frequent adverse reaction to Transderm Scōp is dryness of the mouth. This occurs in about two thirds of the people. A less frequent adverse reaction is drowsiness, which occurs in less than one sixth of the people. Transient impairment of eye accommodation, including blurred vision and dilation of the pupils, is also observed.

The following adverse reactions have also been reported on infrequent occasions during the use of Transderm Scōp: disorientation; memory disturbances; dizziness; restlessness; hallucinations; confusion; difficulty urinating; rashes and erythema; acute narrow-angle glaucoma; and dry, itchy, or red eyes.

Drug Withdrawal: Symptoms including dizziness, nausea, vomiting, headache, and disturbances of equilibrium have been reported in a few patients following discontinuation of the use of the Transderm Scōp system. These symptoms have occurred most often in patients who have used the system for more than three days.

OVERDOSAGE: Overdosage with scopolamine may cause disorientation, memory disturbances, dizziness, restlessness, hallucinations, confusion, psychosis, convulsions, bronchospasm and respiratory depression, and muscular weakness. Should these symptoms occur, the Transderm Scōp patch should be removed immediately, adequate hydration should be maintained, and appropriate symptomatic treatment initiated.

CAUTION: Federal law prohibits dispensing without prescription.

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SMITHSONIAN HIGHLIGHTS

L'Opéra

For five years, San Francisco artist David Beck carved 12 different kinds of wood, and worked gold leaf, gouache, encaustic, eggshell, satin moiré, copper sheeting, lacquered brass and other materials to create his elaborate tribute to the world of grand opera. The allusions to various operas are as encyclopedic and complex as the list of materials. Through the many windows of Beck's miniature opera house, viewers can see 200 mechanized figures (connected to a

labyrinth of cams, cranks, levers, spindles and electric motors beneath the floor) performing or watching the splendid procession from Act II of Verdi's *Aida*. In the audience, characters from *The Ring*, *Turandot* and *Mefistofele* sing along and sway in their seats. The orchestra is whimsically attired in costumes from *I Pagliacci*. Through April 25, *L'Opéra* will be on display at the National Museum of American Art; from 11 A.M. to 3 P.M. daily, on the hour and half-hour, visitors can see the figures in action. A video clip of *L'Opéra* can be seen at www.smithsonianmag.si.edu.

Stonehenge

The Drama of Stonehenge Revealed: A Special Evening at the NASM Planetarium (February 18, 1999) A dramatic recreation of the celestial canopy above the ancient structure when it was new. To purchase tickets, and for information about the many other Smithsonian Associates programs, call 202-357-3030 or visit www.si.edu/tsa.

SMITHSONIAN Website

WWW.SMITHSONIANMAG.SI.EDU

Another place to start finding out about the exhibitions, events, publications, programs and activities of the Smithsonian is our Website. There you will find the *Highlights Calendar* with links to the many pages of the Smithsonian Institution Website.

Exhibitions, Events

COOPER-HEWITT, NATIONAL DESIGN MUSEUM
[NEW YORK CITY]

Unlimited by Design (through March 21) The first major exhibition of products, services and environments designed to meet the needs of people, from toddlers to seniors.

Graphic Design in the Mechanical Age: Selections from the Merrill C. Berman Collection (February 9 through May 30) Posters and other ephemera.

NATIONAL POSTAL MUSEUM

Mayhem By Mail Explores three categories of crime investigated by U.S. Postal Inspectors.

As Precious as Gold The importance of letters from home during the Alaska/Klondike gold rush.

What's in the Mail for You! High-tech

DAVID BECK/NATIONAL MUSEUM OF AMERICAN ART

Go from the dance floor to the trading floor in your pajamas.

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NATIONAL MUSEUM OF NATURAL HISTORY

The newly opened Rocks Gallery completes the installation of the Janet Annenberg Hooker Hall of Geology, Gems and Minerals.

HIRSHHORN MUSEUM & SCULPTURE GARDEN

Directions—Julião Sarmento: Fundamental Accuracy (February 4-June 20) New figurative paintings and sculptures by this Portuguese artist, who made a strong showing at the 1997 Venice Biennale, evoke the calm and self-possession of women.

NATIONAL MUSEUM OF AMERICAN HISTORY

A Collector's Vision of Puerto Rico (through May) Items from Teodoro Vidal's 3,200-object collection. Costumes, carnival masks and more.

NATIONAL PORTRAIT GALLERY

Paul Robeson: Artist and Citizen (through April 18) Memorabilia, pictures, paintings and sculptures.

NATIONAL MUSEUM OF AFRICAN ART

Baule: African Art/Western Eyes (February 7 through May 9) Exhibition of more than 150 works by Baule artists of the Ivory Coast.

New Acquisitions: Gifts from the Lawrence Gussman Collection (through March) Traditional sculptures from Central and East Africa.

ARTHUR M. SACKLER GALLERY

Behind the Himalayas: Paintings of Mustang (through September 26) Australian artist Robert Powell's paintings of traditional architecture.

The Jesuits and the Grand Mogul: Renaissance Art at the Imperial Court of India (1580-1630) (through April 4) The blending of European and Indian artistic traditions that resulted from Jesuit missions to India.

FREER GALLERY OF ART

Beyond the Legacy: Anniversary Acquisitions for the Freer Gallery of Art (through March 14) One hundred gifts and purchases in honor of the gallery's 75th anniversary.

NATIONAL AIR AND SPACE MUSEUM

And a Star to Steer Her By A planetarium show (fee) and an accompanying exhibition, *GPS: A New Constellation*, about navigation, especially the Global Positioning System.

NATIONAL MUSEUM OF AMERICAN ART

Art of the Gold Rush (through March 7) Paintings, watercolors, drawings. *Silver and Gold: Photographs of the Gold Rush* (through March 7) More than 100 daguerreotypes.

HEYE CENTER NATIONAL MUSEUM OF THE AMERICAN INDIAN

[NEW YORK CITY]

The Art of Being Kuna: Layers of Meaning Among the Kuna of Panama (through March 21) Three hundred works—jewelry, baskets and *molas*.

SMITHSONIAN PRODUCTIONS

In "Remembering Slavery" former slaves tell their stories. "The Mississippi: River of Song" features music and musicians along the mighty river. Check local public radio listings.

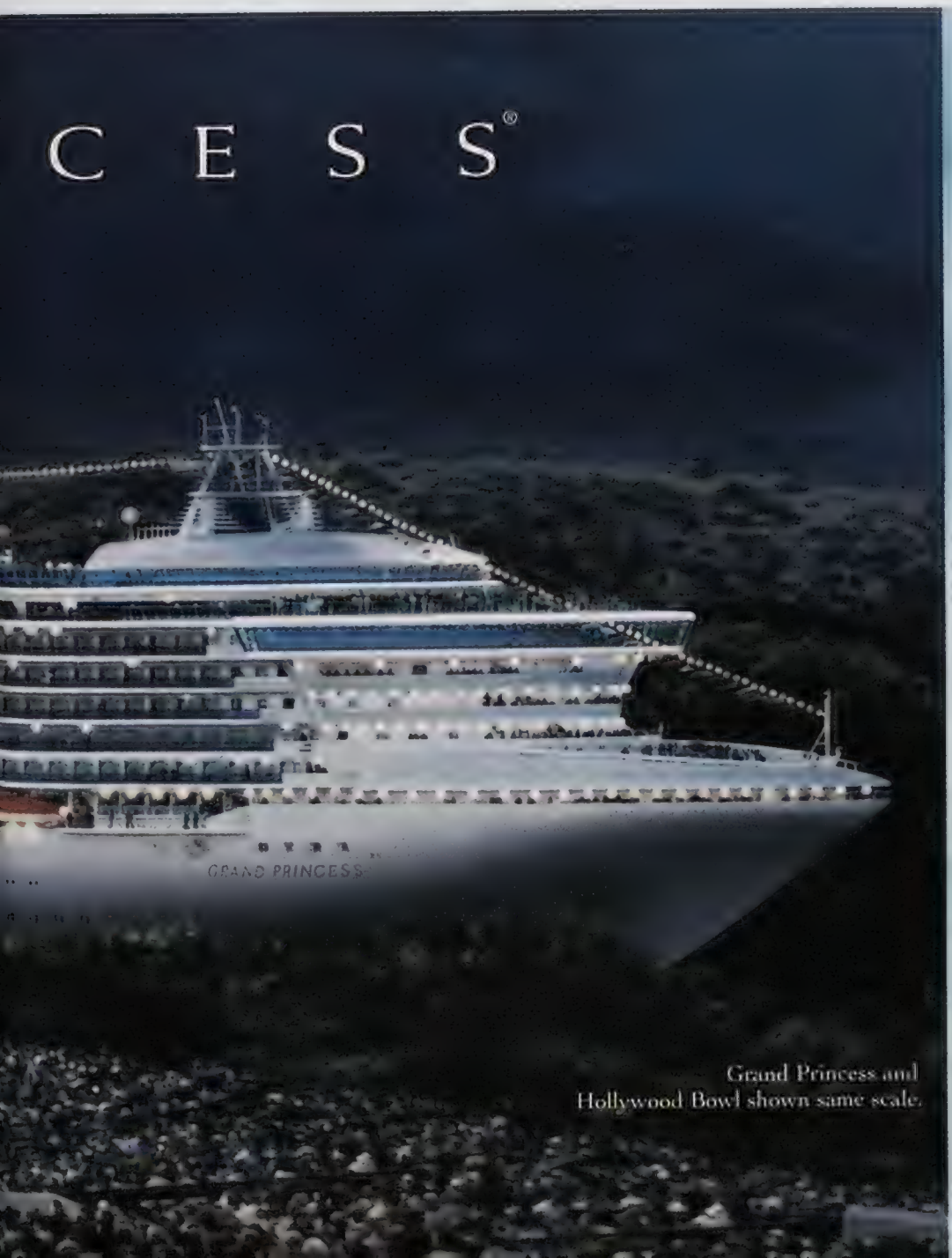
SMITHSONIAN INSTITUTION TRAVELING EXHIBITION SERVICE

Each year, SITES circulates exhibitions of all sizes and subject matter to more than 250 venues. To sponsor a show in your community, write to: SITES, Smithsonian Institution, Washington, D.C. 20560. A listing of exhibitions and additional information is available at www.si.edu/sites.

Planning a Smithsonian Visit?

THE CASTLE—INFORMATION CENTER

Begin your visit at the Smithsonian Information Center's Associates' Reception Desk—open 9 A.M.-4 P.M. daily—in the Castle. Special materials and information on exhibitions, activities and dining await you there. Learn what's new at the Smithsonian and other capital attractions—with brochures, videos, touch screens, electronic maps and more. Smithsonian museums are generally open 10 A.M.-5:30 P.M. daily, except December 25. Receive a free Associates' planning packet: write to Smithsonian Information, Washington, D.C. 20560, or send your request via e-mail to info@info.si.edu, or call 202-357-2700 (voice) or 202-357-1729 (TTY), 9 A.M.-5 P.M., Monday-Friday; 10 A.M.-4 P.M., Saturday-Sunday. Note: Parking on the Mall is limited; Metrorail (subway) is convenient to most museums.



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Sometimes it takes eloquent words to change a country. Other times, all that's required is one simple act.

On February 1, 1960, four Greensboro college students proved just how consequential such an act can be.

They'd been informed at a local lunch counter that it was the store's stated policy to refuse service to Negroes. So, spontaneously and peacefully, they decided to make a statement of their own: They refused to get up, until they were accorded the same basic rights other Americans took for granted.

HERE, FOUR B
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Word of their bold deed spread like wildfire. And soon, the devastating tactic of the sit-in was being used to prick consciences all across the South.

The store has gone the way of separate water fountains now. But two plaques on the site pay silent tribute to the four men and the impact their courageous act had on the civil rights movement.

Of course, these plaques only mark the beginning of the rich assortment of African-American history and heritage that awaits you in North Carolina. Not far across town, for example, you'll find the Mattye Reed African Heritage Museum, which showcases the largest collection of African art in the southeast.

Just up the road in Durham, you can take in some enlightening lectures and exhibits at the Hayti Heritage Center, housed in and around a 105-year-old church.

Photo By Jack Moebes. Used with permission of the News & Record.

most heroic figures: Captain Richard Etheridge, who in the late 1800s commanded America's only all-black Coast Guard station, and whose acts of bravery were legendary.

And at the Somerset Place State Historic Site, you'll find the first former plantation in the nation to celebrate a homecoming for the descendants of the African-American and white families who helped build it.

For more information, including special itineraries that focus on African-American heritage, call 919-733-7559.

RAVE PEOPLE OVE. WHAT THEY ENTIRE NATION.

Then take a stroll downtown on Parrish Street, where entrepreneurs of color were so successful in the '20s, it was nicknamed Black Wall Street.

(North Carolina Mutual Life Insurance Company, America's largest black-owned business, got its start here.)

In Manteo lies a memorial to one of North Carolina's most heroic figures: Captain Richard Etheridge, who in the late 1800s commanded America's only all-black Coast Guard station, and whose acts of bravery were legendary.

And explore a part of history that moves people of all colors in the most extraordinary way. Forward.

NORTH CAROLINA

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millennium 2000

FORGET Y2K!

THE MILLENNIUM IS NOT A PROBLEM; IT IS AN EXCUSE FOR 1,000-YEAR LEAPS BACKWARD INTO HISTORY

THIS ISSUE CARRIES THE FIRST OF SEVERAL STORIES LINKED to the millennium. Among other purposes, they aim to provide relief from the pervasive and pesky "Y2K" syndrome, that myopic angst about how the world's computers will feel when they wake up this coming January 1. Will they think we are back in January 1, 1900? Or will everybody's paycheck still be OK?

That is no small matter. But the arrival of A.D. 2000 probably ought to put us in mind of somewhat broader perspectives, including some long-lens looks into the far past, or leaps of the imagination back and forth in human history, 1,000 years at a time. What was going on a thousand years ago? Or, apart from the major event that gave rise to the terms "B.C." and "A.D." in our dating system, two thousand years ago?

If the editors of *Time* had been around to do their Man of the Year search near the time of the birth of Christ, their choice would not have fallen on the babe in the manger, but on Caesar Augustus, all-powerful in an empire that stretched the rule of Roman law from Britain across Europe and into Asia Minor. Augustus himself was about to be declared a god. One millennium ago *Time* would have picked Leif Eriksson; in the year 1000, navigating in a Viking longship, he sailed west to the New World and called it Vinland.

Because time flies, and keeping precise track of it, not merely in thousand-year units, but in days, months and years, as well as seconds, minutes and hours, is a human preoccupation, two of our millennium stories deal directly with time. The first article in the series (p. 48), adapted from a remarkable new book by David Ewing Duncan, describes the long search for an accurate cal-

endar and how, over tortuous centuries, science and religion poked and pinched into existence the one we still use. (For hundreds of years a major motive that drove calendar searchers was the pious compulsion to determine exactly when Easter ought to fall.) The second story concerns chronometers, and especially how their evolving degree of accuracy influenced—and continues to influence—trade, exploration and war.

Clocks and calendars, being human inventions, are relatively recent. Another recent—and arguably human—invention is the Devil himself. An upcoming story suggests that if the Devil didn't exist, it might have been necessary to invent him (or her), and tries to get a fix on how the Devil is making out today, in an age widely held to be shameless.

Lashed to the dailiness of life, most people reckon a generation (at four to a century) as a considerable amount of time. Even the "threescore years and ten" biblically allotted to one man's lifetime can seem interminable. The three to four thousand years of history that go back to include the flowering of ancient Greece are regarded as vast stretches of time, in part because so much history has been crammed into them. Other civilizations started earlier, but it is only in the past three millennia that most of the events and human inventions that we think of as adding up to Western Civilization appeared. During this span there arose, in the arts and government, in religion and philosophy, above all in science, technology and medicine, the works of humankind that we point to most often as proof that we are making some kind of progress: the printing press, the steam engine, barbed wire, the telephone, electricity, the "painless" air drill that dentists now use, penicillin and the cappuccino machine, not to mention such mixed blessings as the internal combustion engine, television, and atomic power.

In that time, the Western world, at least, has also seen astonishing variations in religion, starting with polytheism, its most dramatic example being a dysfunctional family of deities on Mount Olympus. The father had a penchant for pursuing pretty mortals; his wife was vindictively jealous; the kids feuded back and forth. How to propitiate them all became a complex and risky business.

In most ways monotheism was an immense improvement—a radiant vision of the whole creation unified, alive with moral purpose, with a single power keeping score in this world and the next. Whether divinely inspired or not, it is surely one of the great and enduring inventions of man. Two hundred years ago, however, a more secular vision began to take hold, not based on the existence of a divine being but on high hopes for the perfectibility of human nature. The Marquis de Condorcet, an Enlightenment philosopher, put it clearly in 1793 when he wrote, "The total mass of the human species, through alternating periods of calm and agitation, good and evil, forever marches, albeit at a slow pace, towards a greater perfection." With continued help from science and a serious misreading of evolution as progress, that idea has become a secular religion of the modern world.

The change in attitude is easily summed up by a pair of diametrically opposed quotations. One, from Psalm 8, asks a rhetorical question: "What is man, that thou art mindful of him?" The other comes from the Greek Sophist Protagoras: "Man is the measure of all things." As the end of the second millennium A.D. approaches, the two resounding assertions may be worth putting in perspective, perhaps even on New Year's Eve of 1999, as a reminder not only of the breathtakingly brief time during which human

JOSEPH SCROFANI

beings have inhabited the planet, but of the breathtakingly long history of life on earth before we ever appeared. There is some measure of encouragement, perhaps, in considering just what latecomers we are.

Celebrated biologist H. J. Muller once asked the readers of one of his essays to imagine the history of all life-forms on earth as a rope composed of evolving cells and genes stretching several hundred miles from New England to New York City, and ending at the center of a desk in the Wall Street office of J. P. Morgan.

The line represents three or four billion years, starting as far away as Boston with the appearance of the first minute signs of life on earth, primeval protoplasm. Blind chemical forces go to work. Genes mysteriously multiply and differentiate. Mutate, or don't. Trial and error in numbers beyond computing. Beyond imagination, even. Following along the line, Muller notes, will seem boring at first, because "there will be no actual 'beasts' as we ordinarily think of them (four-footed land animals) until we are well within the limits of New York City."

It is not until the line reaches Harlem that the first mammals and birds appear, coexisting with huge dinosaurs who do not drop out entirely until the lifeline crosses 42nd Street. Monkeys first arrive a bit south of there, somewhere around Macy's, but nothing more complex than an ape shows up until the line has reached a spot directly in front of the House of Morgan. Inside the building, 15 feet from the desk, stands the first Neanderthal. Homo sapiens, "'man the wise,'" as Muller notes with some irony, "leaves his first remains within the private office, only seven and a half feet from the desk." The earliest known "civilization" (not more than 14,000 years ago) leaves its crockery only "a yard and a half from the desk."

Muller concludes: "On the desk, one foot from the center, stands old King Tut. Five and a half inches from the center we mark the Fall of Rome and the beginning of the Dark Ages. Only one and a half inches from the present end of the cord [New England-to-New York lifeline] come the discovery of America and the promulgation of the Copernican theory—through which man opens his eyes for the first time to the vastness of the world in which he lives and his own relative insignificance." Half an inch from the end "start the first faint reverberations of the Industrial Revolution. . . . A quarter of an inch from the end Darwin speaks, and man awakes to the transitory character of his shape and his institutions."

A few of the proportions have changed minutely since the piece was written more than a half-century ago. But anyone wanting to put the "Y2K" dilemma in perspective can safely turn to Muller. *—Timothy Foote*

BY DAVID EWING DUNCAN

IT TOOK TWO MILLENNIA TO GET THE ONE WE NOW USE; WE OWE A LOT TO THE SUN AND MOON, TO CAESAR, POPE GREGORY AND, OH YES, THE EARL OF CHESTERFIELD

HE WAS A TINY MAN, THE FELLOW RESPONSIBLE for the year 2000—and by extension for millennial cruises to the Pyramids, talk of millennial apocalypse, and millennial fetes from Times Square to Timbuktu. The Romans literally called him Dennis the Little—Dionysius Exiguus. His stature, however, had nothing to do with his outsize ambition: to transmute time itself.

Dennis the Little was an abbot and mathematician. He lived in Rome in the sixth century, a century that today, thanks to him, we designate as A.D. Romulus Augustulus, the last boy-emperor, had been ousted, and the eternal city, its walls breached, was a shattered husk. The only district with a pulse still beating lay outside the city, across

Stonehenge, huge stone blocks set up in concentric circles, suggests that Bronze-age Britons were solar, rather than lunar, in their attempts to measure the years, and were sophisticated enough to have calculated the sun's precise location in the sky at summer solstice.

the Tiber at St. Peter's, in what we now call the Vatican. Dennis spent his career there, organizing church writings and tinkering with time. His contemporaries considered him brilliant, but he was also a bit humorless and stodgy, to judge by the letters he wrote.

In 525, Pope John I asked Dennis to calculate dates on which all future Easters should be celebrated. Then as now this was a complicated task, given the formula adopted by the church just two centuries before—that Easter shall fall on the first Sunday after the first full moon after the spring equinox. But Dennis dutifully studied the positions of the moon and the sun, and created a chart of upcoming Easters, beginning in 532. Except that in the Rome of Dennis' day, nobody designated the year as "532." For Roman citizens it was either the year 1285, dated from the founding of Rome, or the year 248, based on a calendar that started with the first year of the reign of Emperor Diocletian.

It was that fact which gave Dennis his great inspiration. Instead of using a time line glorifying Diocletian, a notorious persecutor of Christians, Dennis calculated his dates based on the birthdate of Christ. As he put it, he "preferred to count and denote the years from the incarnation of our Lord, in order to make the foundation of our hope better known. . . . " The good abbot's preference appeared on his new Easter charts, which began with *anno Domini nostri Jesu Christi* DXXXII—the year of our Lord Jesus Christ 532, or A.D. 532 for short.

An otherwise lackluster pope, Gregory XIII gave his name to our present calendar by dramatically revising it in 1582.

Using much the same logic, if a different worldview, some today prefer to call the calendar years C.E. or B.C.E.—for "common era" and "before common era"—rather than A.D. or B.C. But the crucial date remains the same, the one that Dennis the Little thought he'd pinned down, the date of Christ's birth. In fact, Dennis got it slightly wrong. As modern biblical historians know, Jesus of Nazareth was most likely not born in what Dennis called A.D. 1. Modern scholars lean toward 5 or 6 B.C.

Dennis' effort is just one of many failed attempts to create an accurate calendar. That may seem ridiculous to people living in a time when calendars dangle from a billion walls and timepieces festoon dashboards, nightstands and office cubicles: squawking, beeping, purring; waking us up and putting us to sleep. We live and breathe time with the faith of monks, believing that our division of time into months, weeks, days, hours, minutes and seconds is as solid as granite. But with the exception of the day, which is a natural phenomenon that would occur with or without Swatches and Rolexes, these units of time were all made up. As arbitrary as driving on the right-hand side of the road in America, they are simply traditions that everyone at some point agreed upon, though no one can quite remember when or why.

The calendar now used by some six billion people did not even become the world's common calendar until the year 1949, when Mao Tse-tung seized power. Cheered by his People's Army as he stood atop the Gates of Heavenly Peace, Mao announced the formation of the People's Republic. The Communist flag would thenceforth be China's official flag, Peking would be the capital of the new republic, and the Chinese would, once and for all, use the Gregorian calendar that had been officially, but ineffectively, adopted by China in 1912. This completed the world conquest of a version of the calendar named after an otherwise lackluster 16th-century pope, Gregory XIII. He earned this timeless epitaph by revising the calendar already modified by Dennis the Little and first launched some 16 centuries before Gregory by Julius Caesar, who in turn had borrowed it from Egypt. The people of the Nile had invented the basis of their version 4,000 years earlier. On the way, smatterings of other time-measuring schemes were incorporated—calendric fragments from India, Sumer, Babylon, Palestine, Arabia and pagan Europe.

It was an effort as monumental as raising the Pyramids and landing men on the moon—except that nearly every calendar in history has been inaccurate. One reason is that the tropical, or solar, year—the precise measure of time

When the insular British finally adopted Gregory's calendar in 1752, citizens were outraged. In a satiric painting of a political dinner by William Hogarth (detail above), a placard reads: "Give us our eleven days!"

between recurring seasons—runs an awkward 365.242199 days, a tough number to calculate without modern instruments. A further complication is the tendency of our asymmetrical little planet to wobble and wiggle ever so slightly, yanked this way and that by the moon's elliptical orbit, and the gravitational tug of the sun, as well. Result: each year varies by a few seconds, making the exact length of The Year almost as unpredictable as where lightning will strike next. If this sounds like hairsplitting, it is. Yet it also points up some of the conundrums faced by ancient astronomers, kings, priests and calendar-makers—driven by the need to know when to plant crops, collect taxes and offer sacrifices to appease their gods—in trying to conjure accurate calendars.

Which they all failed to do. The first efforts to keep a record of time may have come as early as 30,000 years ago, when Cro-Magnons in Europe and Africa peered upward at the moon, apparently noticing that Luna's phases are not only diverting, but steady and predictable. Then, it seems, they did something remarkable. They scratched what they saw into rocks and bones, creating what may indeed have been the world's first calendars. One Paleolithic artisan, working 13,000 years ago at Le Placard on the Dordogne River in France, carved a sequence of notches into an eagle bone, daily symbols that seem to keep track of the phases of the moon. Heady stuff for fur-clad hominids living at the end of the last ice age. Such notches may have allowed moon-gazers to predict a full moon for hunting or raiding a rival clan, or to count how many moons would pass until winter ended and spring returned. At some point in history, ancient astronomers also realized that 12 lunar cycles come very close to equaling a "year" of seasons.

The moon was not the only natural clock used by the ancients. Living in intimate contact with nature, early calendar-makers also noticed that when certain birds flew south, winter was on its way, and that the appearance of certain stars in the sky signaled spring. In the eighth century B.C., the poet Hesiod wrote his epic *Works and Days*, much of which is essentially a calendar in verse—a record of Greek oral lore about time and nature. He advises waiting until the month when the cuckoo sings before harvesting cereals, and warns that men's sex drive diminishes in the late summer, when "goats are at their fattest" and "the wine tastes best." More recently, the Natchez of the Mississippi River Valley used seasonal cues to name their

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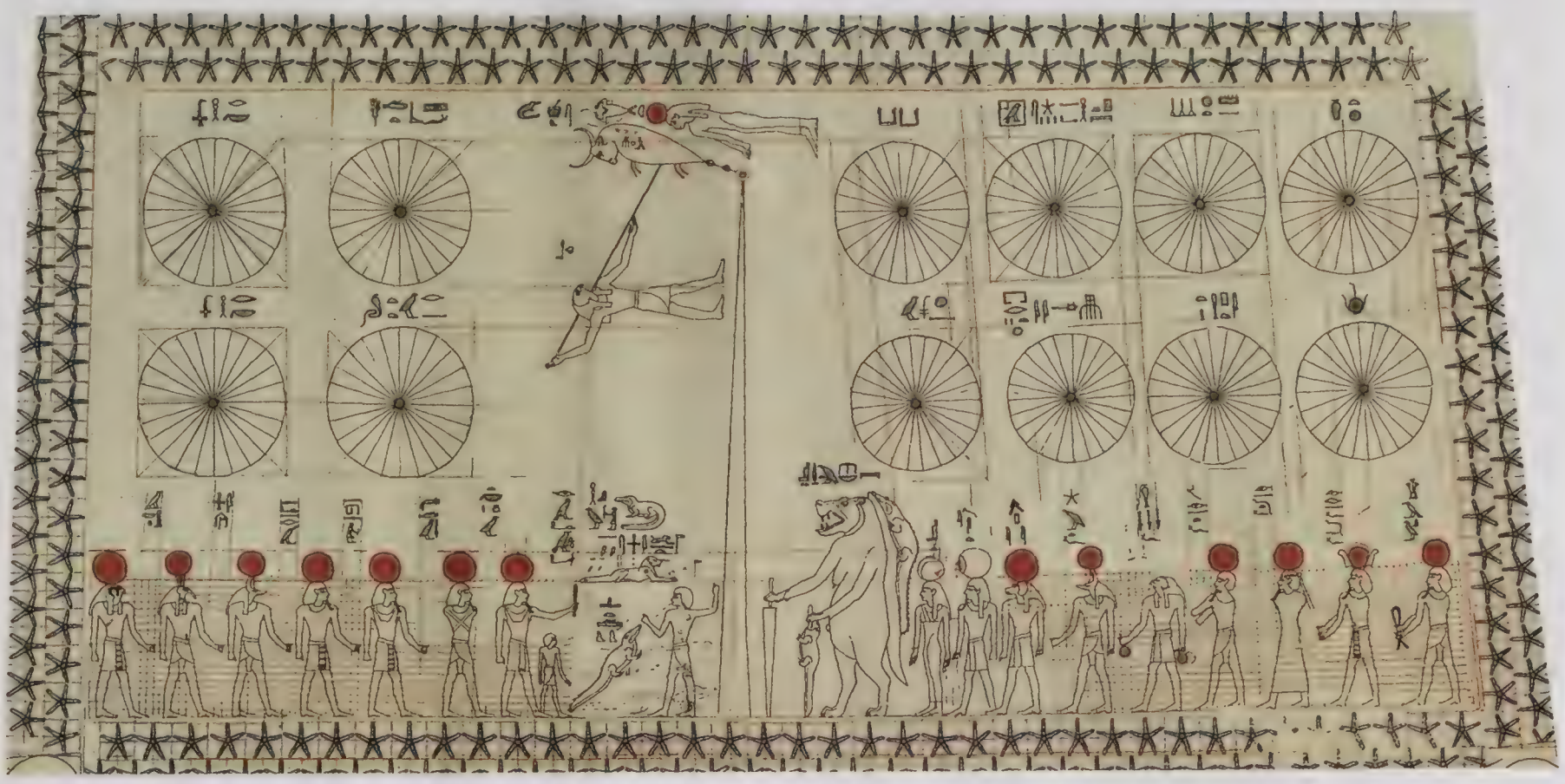

The Egyptians, probably the first to reckon the length of a solar year, divided their calendar into 12 months of 30 days (plus 5 extra days). In this tomb painting (c. 1500 B.C.), the large circles represent feast days for each month, with each day divided into 24 hours.

months, which included Deer month, Strawberries month and Little-corn month. So did the Malagasy people of Madagascar. Their list of months include a Tamarinds-and-Beans-Are-Ripe month and a Rains-Rot-the-Ropes month.

But nothing intrigued the ancients more than the moon. Mystical and alluring, it became not only a celestial clock but a goddess as well. She was Khonsu to the Egyptians, Nanna to the Sumerians, and three different names to the Greeks and Romans: Hecate when the moon was dark, Artemis (Diana) when it waxed, and Selene (Luna) when it was full.

The imperial calendar became the sacred calendar of the church, a system of dates that no one dared challenge because it was believed ordained by God.

But alas, 12 lunar months (at about 29.5 days each) equal only 354 days—11 days and several hours short of a solar year. Such a temporal discrepancy quickly throws lunar calendars out of alignment with the seasons, flip-flopping the summer and winter solstices in just a little more than 16 years. In order to compensate, devotees of Luna resorted to various schemes.

In the 21st century B.C., the Sumerians found that their various lunar calendars—including one with 12 months of 30 days, totaling 360 days in a year—were still many days off, requiring the insertion of additional months every few years. As early as 2357 B.C. legendary Chinese emperor Yao put sun and moon in sync with a calendar that intercalated two extra months every five years. That was later revised to allow for seven extra months every 19 years, which more or less averaged to 365-day years. By the end of the fifth century B.C. others, including the Babylonians and Greeks, had come up with essentially the same system, called "Metonic" after the Greek astronomer Meton.

Though cumbersome, the system of adding seven months over 19 years—with other minor adjustments—proved lasting. The Jewish calendar, which adopted this and other elements of the Babylonian, is still in use today. But it's a rare holdout. In ancient times, since there were few—if any—accurate measurements of a year or a lunar month, these stratagems always fell short (or long). They also proved too complicated: people forgot to add days and months on schedule; years ebbed and flowed more with the whims of priests and kings than according to science.

Not all early civilizations were seduced by the moon, though. In the Americas, both the Maya (who developed an elaborate system of recording dates) and the Aztecs created distinct 365-day years, coming very close to a solar year, as well as separate lunar years. And some 4,000 years ago on Salisbury Plain in England, the enigmatic builders of Stonehenge arranged great slabs of bluestone to capture the exact moment of the summer solstice. This provided them with a calendar capable of determining a year of 365 days and several hours.

But the first people of the sun were the Egyptians. As early as the fifth millennium B.C. they figured out a 365-day year, apparently when someone along the Nile got the idea of planting a stick on its shoreline to measure the high point of the river's annual flood, which falls at the same time each year. What these anonymous calendar-makers discovered was yet another giant clock: 4,000 miles of rushing water driven by the seasonal movements of the

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This fragment of a 16th-century Aztec religious calendar depicts two gods fighting; the one also swallowing a man is the plumed serpent Quetzalcoatl. The small rectangles, representing days, are illustrated by tiny deities, as well as assorted birds and butterflies. The Mayan conch shell (opposite) is etched with two columns of figures showing a date equivalent to March 17, A.D. 761.

earth and the rains in Central Africa. This allowed them to create a solar calendar before they had raised the great pyramids, establishing a system of 12 months of 30 days, with 5 days tacked on as holidays to celebrate the birthdays of Osiris, Isis, Horus, Nephthys and Set.

The Egyptians made another timely discovery: Sirius, the Dog Star, arises in the dawn sky once a year in a direct line with the rising sun, and at a time coinciding with the flooding of the Nile. By mounting special brass rings on the tops of obelisks, Egyptian astronomers were able to record with great precision the exact moment when Sirius crossed through the ring, as observed from a fixed point on the ground. They began to notice that this event was lapsing by about six hours each year, leading them to conclude that the year is longer than 365 days by about a quarter of a day. This revelation brought them within about 11 minutes of the true year, though for centuries Egypt's tradition-obsessed priests refused to adjust their 365-day calendar. They let it drift some six hours a year, dropping a day every four years.

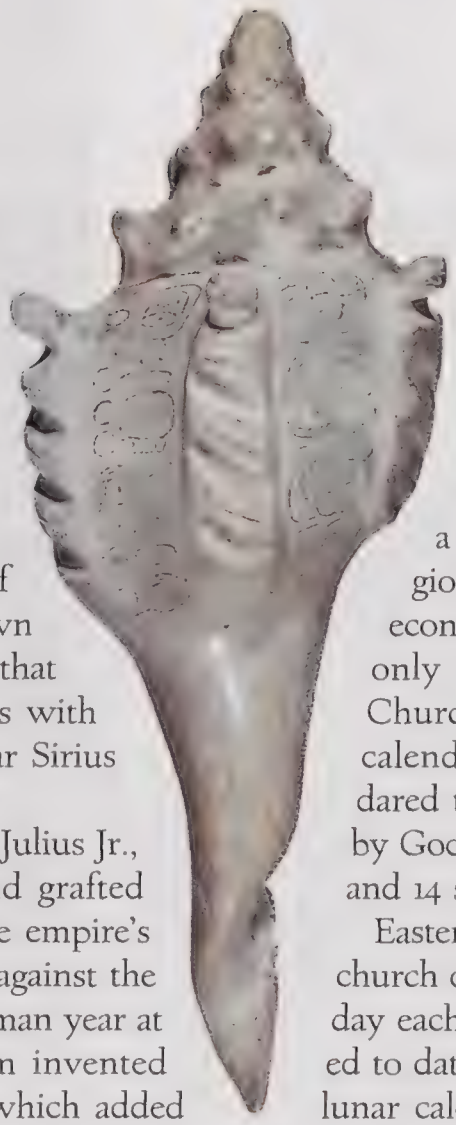
Almost everywhere else, Luna reigned supreme—including in what was then a small, backwater enclave perched above the Tiber River, and that would one day subsume not only Egypt but its calendar. According to legend, Rome's original calendar was invented by the city's first king, the mythical Romulus, who is said to have founded Rome in 753 B.C. He created a calendar with only ten lunar months—possibly, says the Roman poet Ovid, "because that is the number of fingers by which we are wont to count." Whatever the reason, his calendar was off by 61 days, but it gave us the names of all but two of our months. Romulus gave the first four months descriptive names—Martius, for Mars, the god of war; Aprilis, which seems to have referred to either the goddess of love or the raising of hogs; Maius, for Maia, mother of Mercury; and Junius, for Juno, the queen of the Roman gods. Then he fell back on ordinal numbers, starting with "fifth": Quintilis, Sextilis, September, October, November and December.

Around 700 B.C. Numa Pompilius—Romulus' supposed successor—is said to have added Januarius, named for the two-faced Janus, god of looking forward and backward; and Februarius, named for a Roman festival of purification. This left the Roman calendar as accurate—and as flawed—as every other 354-day year, though the Romans got a bit closer by adding a day to make it 355 (they had a superstition about even numbers).

All this changed one October day in 48 B.C. when a Roman warship arrived off the coast of Egypt. On board was Julius Caesar, in hot pursuit of Pompey, his rival in Rome's civil war. This was a critical moment in calendric history. In Alexandria, Caesar met the woman who became his most famous mistress; their love affair gave the world its present calendar.

Heads of 12 Greco-Roman deities ring this second-century A.D. sculpture. The Romans named a number of months after gods, including March and June.

A dazzling intellect and exotic beauty, the 21-year-old Cleopatra (SMITHSONIAN, February 1997) was then embroiled in a civil war against her teenage brother, Ptolomy XIII. The 52-year-old Caesar helped her win it, but only after several busy months of battles, feasts and trysts. One wonders how they found time to talk calendrics. But Alexandria, the site of the world's greatest library, had long been a magnet for scholars and artists from far and near. Astronomers came, too—some of the greatest in the ancient world. They had pondered the length of



the year, calculating it to within six minutes of its true duration.

Caesar was attending a lavish feast when Cleopatra's court scholars first told him about the Egyptian calendar. According to the Roman poet Lucan, the queen was decked out that night in a wreath of roses for her hair and a diaphanous gown that revealed "her white breasts," an outfit that Caesar overlooked long enough to discuss with assorted scholars the fine points of the star Sirius and the flooding of the Nile.

In 47 B.C., with Cleopatra pregnant with Julius Jr., Caesar returned to Rome as dictator, and grafted Egypt's calendar onto Rome's. By then the empire's calendar was running a full 90 days slow against the true year. To repair it, Caesar fixed the Roman year at 365 days, borrowing the leap-year system invented (and then abandoned) by the Egyptians, which added an extra day every fourth year to compensate for the additional quarter-day.

Roman months would no longer be in thrall to the moon. Instead, he decreed that they would alternate in length between 30 and 31 days, with the exception of February, set at 29 days—30 in a leap year. That still left Rome's calendar in error by some 11 minutes a year.

To bring the calendar back in alignment, Caesar also ordered one of the more radical time alterations in history, lengthening the year 46 B.C. by 90 days. This created a year that stretched on for a time-numbing 445 days. Optimistically, Caesar called it the *ultimus annus confusionis*, the "last year of confusion." The extra days caused disruptions throughout the empire in everything from contracts to shipping schedules, so everyone else simply called it the Year of Confusion. But when January 1, 45 B.C., finally rolled around, most Romans were happy to have the stable, uncomplicated Julian calendar.

Or so it seemed. But Rome's priests managed to foul up even this simple calendar, counting leap years every three years instead of four. This threw the calendar out of whack once again. Confusing corrections followed for decades until Caesar's convenient system of alternating 30- and 31-day months was dropped, leaving us with the basis for that annoying Old English ditty that starts with "Thirty days hath September. . . "

Three centuries later, time took another turn in Rome because Emperor Constantine had embraced a new religion, Christianity. As part of his conversion he added a new slate of holidays and festivals, adopted the Jewish seven-day week and designated Sunday, rather than the Jewish Sabbath or the Roman Saturn's Day, as a day of worship. This officially established the seven-day week for the Roman Empire—and eventually for the world.

Constantine also set in motion a profound shift from Caesar's science-based approach, to a calendar that was gradually usurped by religion. This process accelerated as the political and economic might of Rome collapsed, leaving behind only one intact imperial institution: the Catholic Church. The imperial calendar became the sacred calendar of the church, a system of dates no one dared to challenge—because it was believed ordained by God—even though it was still faulty by 11 minutes and 14 seconds a year.

Easter complicated matters further, because the early church decided not to celebrate it on the same calendar day each year, but according to a system that attempted to date Christ's resurrection according to the Jewish lunar calendar. This was because eyewitness accounts in the Gospels fail to name a specific date for the Resurrection beyond noting that it occurred on a Sunday during the Jewish Passover. Breaking from any association with Jewish timekeeping, Christians began to use a complicated formula that places Easter on the first Sunday after the first full moon after the spring equinox, a method established by a great council of bishops convened by Constantine in 325 at Nicaea. For centuries, the Easter rule condemned monks to pore over endless calculations in a mostly futile attempt to determine the exact date of upcoming Easters.

Still, it was that concern about Easter that gave the world Dennis the Little and its current common calendar. His error about the exact date of Christ's birth is hardly surprising, given the intellectual chaos engulfing Europe in what used to be called the Dark Ages. The epicenter of learning was shifting east to the domains of Islam.

Spurred on by their potent new religion, the armies of Islam had stormed out of the Arabian Desert in 632 to seize a vast swath of territory, stretching from the Indus River and the steppes of east-central Asia across North Africa to the Pyrenees. One Arab scholar, Abu Abdallah Mohammed Ibn Jabir al-Battani, came within 22 seconds of the true year in the ninth century. Two hundred years later, the Persian poet and scientist Omar Khayyam came even closer. Despite these remarkable accomplishments in the realms of astronomy and mathematics, the Islamic calendar remained—as it does today—strictly a lunar affair, drifting behind the seasons by 10 or 11 days a year.

Slumbering cerebrally through this period, Europe did not seriously begin to stir until the 11th and 12th centuries, when Arab learning and the long forgotten texts of ancient Greeks and Romans began to permeate the gloom. Even-

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tually, European scholars, using Greek and Arab science to prove their findings, confirmed that the standard calendar was flawed. Yet not many were bold enough to challenge the church on a matter so fundamental as measuring time.

Then came a remarkable English friar named Roger Bacon, a true original. "The calendar," he wrote in 1267, "is intolerable to all wisdom, the horror of all astronomy, and a laughing-stock from the computors [mathematician's] point of view." Bacon was ahead of his time. His ruminations dazzled his contemporaries, but also frightened them. What were they to think of a man who pondered what causes a rainbow, invented a formula for gunpowder, designed a telescope and predicted such things as the invention of eyeglasses, airplanes and high-speed engines?

France's short-lived revolutionary calendar was dated from September 22, 1792, the day after the new republic had been declared. The months, all given new names, were set at a consistent 30 days apiece.

In 1265, Pope Clement invited Bacon to write down his thoughts. He worked furiously to prepare a series of treatises that were highly critical of the church, but had the bad luck to finish them only just before Clement died. Roger Bacon's own religious order, the Franciscans, eventually imprisoned him for his heretical tendencies.

It took the church 300 years more to admit that its calendar was defective. By then, Caesar's 11-minute gap had accrued to about ten days, pushing the true spring equinox, for instance, back from its calendar date of March 21 to March 11. More horrific for devout Christians was the realization that every holy day, including Easter, was being celebrated at the wrong time.

Change did not come until February 24, 1582, when 80-year-old Pope Gregory XIII signed an edict restoring Europe's calendar to a proper alignment with the sun. The core of Gregory's reform was something called the leap-century rule, which cancels out three out of four leap years falling at the turn of each century, shortening Caesar's average year to compensate for the 11-minute drift. Under this rule the year 2000 would be a leap year, but 1700, 1800 and 1900 would not. To repair the ten-day rift, Gregory ordered his own version of Caesar's Year of Confusion, simply striking ten days out of the year 1582. The cut occurred in October. People in the affected countries went to bed on Thursday the 4th and woke up not on Friday the 5th, but on Friday the 15th.

In Frankfurt, angry mobs rioted, convinced the pope had stolen ten days out of their lives. Bankers wondered how to calculate interest in a month only 21 days long. Sailors, smiths, weavers and muleteers fussed over wages missed, and kings and accountants fretted over taxes not collected. Enraged Protestants, already in a fever pitch of anti-Catholic hysteria—this was the century of Luther and Calvin—railed against the cut as work of the the devil. "We do not recognize this Lycurgus (or rather Draco, whose laws were said to be written in blood), this calendar-maker," fumed a fiery German theologian named James Heerbrand, "just as we do not hear the shepherd of the flock of the Lord, but a howling wolf."

But the astronomy behind the new calendar was unshakable. It was based on the new observations (if not the controversial theories) of Nicolaus Copernicus, among others, and the painstaking calculations of Aloysius Lilius, a little-known physician-astronomer. Lilius is the unsung hero of our calendar, the man who crafted the complex equations that proved the leap-century rule was simpler and neater than dozens of rival solutions.

The papal mandate was not accepted everywhere in 1582. Only Italy, Spain, Portugal and Poland complied right away. France waited until December. Belgium and the Catholic states of the Netherlands dropped the ten days after December 21, which meant skipping right over Christmas and New Year's Eve. By 1584, most other Catholic states had gone along. Protestants continued to resist, however, leaving Europe a patchwork of dates as people coped with having two calendars—the "Old Style" and "New Style," or O.S. and N.S. for short. This meant that if you departed from, say, Catholic Regensburg in Germany on January 1, you would arrive 60 miles away in Lutheran Nuremberg on December 22 or 23 of the previous

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year. Protestant Germany finally accepted the new calendar in 1700.

The last major holdout for the Old Style in the west was Britain. Englishmen waited 170 years, until 1752, in fact, to make the transition. It was finally done because author and politician Philip Dormer Stanhope, Earl of Chesterfield—famous for his letters to his son—became so outraged by the situation that he took on calendar reform as a personal crusade. Chesterfield finally convinced Parliament to act in a unanimous vote in 1751. In one of his letters to his son, he wrote: "It was notorious, that the Julian calendar was erroneous, and had overcharged the solar year with eleven days" (eleven because, since Gregory's reform, the Old Style had slipped by yet another day). The days dropped by the British parliament fell between Wednesday, September 2, and what would become Thursday, September 14. To ease the bedlam that might have resulted in a society far more complex than Europe in 1582, Stanhope penned a long list of practical rules governing the changeover in matters such as contracts, court dates, elections, and even staggered release dates for prisoners.

Still, mobs apparently gathered in London and elsewhere to shout, "Give us back our 11 days." In Bristol, riots reportedly left several people dead. London bankers refused to figure taxes on the usual date of March 25, 1753. They waited 11 days, until April 5—which is still the end of the tax year in Britain. In Philadelphia, Benjamin Franklin greeted the change with aplomb. "And what an indulgence is here," he wrote in *Poor Richard's Almanack*, "for those who love their pillow to lie down in peace on the second of this month and not perhaps awake till the morning of the fourteenth."

The Gregorian calendar is running slow by about 26 seconds a year. By the year 4909, we will find ourselves behind by an entire day.

During the next 200 years, other unreformed countries in Europe converted, but not without resistance. The new republic formed by the French Revolution cast off all links to its timekeeping past, creating a calendar of 30-day months and 10-day weeks (with 5 days thrown in for good measure). Russia did not first adopt the Gregorian calendar until 1918, after the Bolsheviks seized power (by which time they had to drop 13 days—February 1-13—to get even).

The world's agreed-upon calendar is not perfect to be sure. Utopian calendar reformists, insisting that months should have a more consistent number of days or that dates should fall on the same day of the week each year, demand that the whole thing be revamped.

But by and large, we muddle along with the Gregorian calendar with few complaints, despite modern atomic clocks that now keep time accurately to within a billionth of a second. Ironically, given all the effort over the millennia to calculate an exact year, this hyperprecision has overshot the mark, since the Earth wiggles and wobbles in space, causing fluctuations of a few seconds each year—which means the atomic clocks must be adjusted to keep in sync with it. The Gregorian calendar is also running slow by about 26 seconds per annum. It's already put us back three hours; eventually, we will be behind by an entire day. But not to worry. It won't happen until 4909, in the last century of the fifth millennium.

And by then, who knows what clocks, calendars—or civilization itself—will look like?

David Ewing Duncan has written a highly acclaimed biography of Hernando de Soto and, just lately, the best-seller Calendar: Humanity's Epic Struggle to Determine a True and Accurate Year *(Avon Books).*

In a 12th-century English calendar, months were linked to work or play appropriate to the season. From left: Feasting (January/February); sheepshearing (June/July); and harvesting (August/September).

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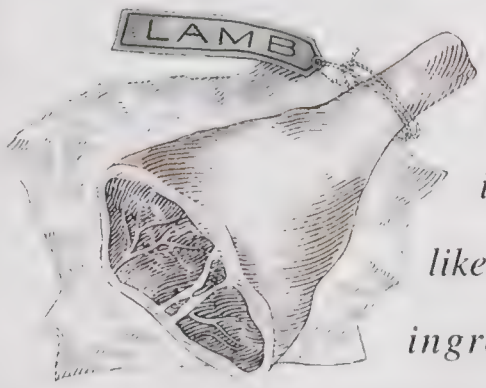

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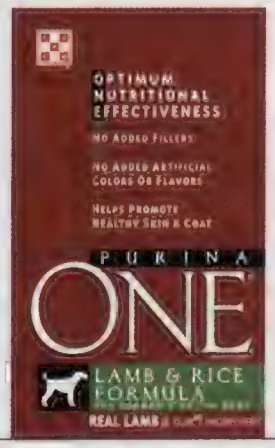

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JOHN SINGER SARGENT

BY STANLEY MEISLER

Shown at the 1882 Paris Salon, Sargent's monumental and theatrical *El Jaleo* captures the passion of flamenco music and dance. The drama, light and mood of the painting are reminiscent of Goya, but the work also reflects Sargent's admiration for Velázquez. The placement of the figures and use of light echo the rhythms of the dance.

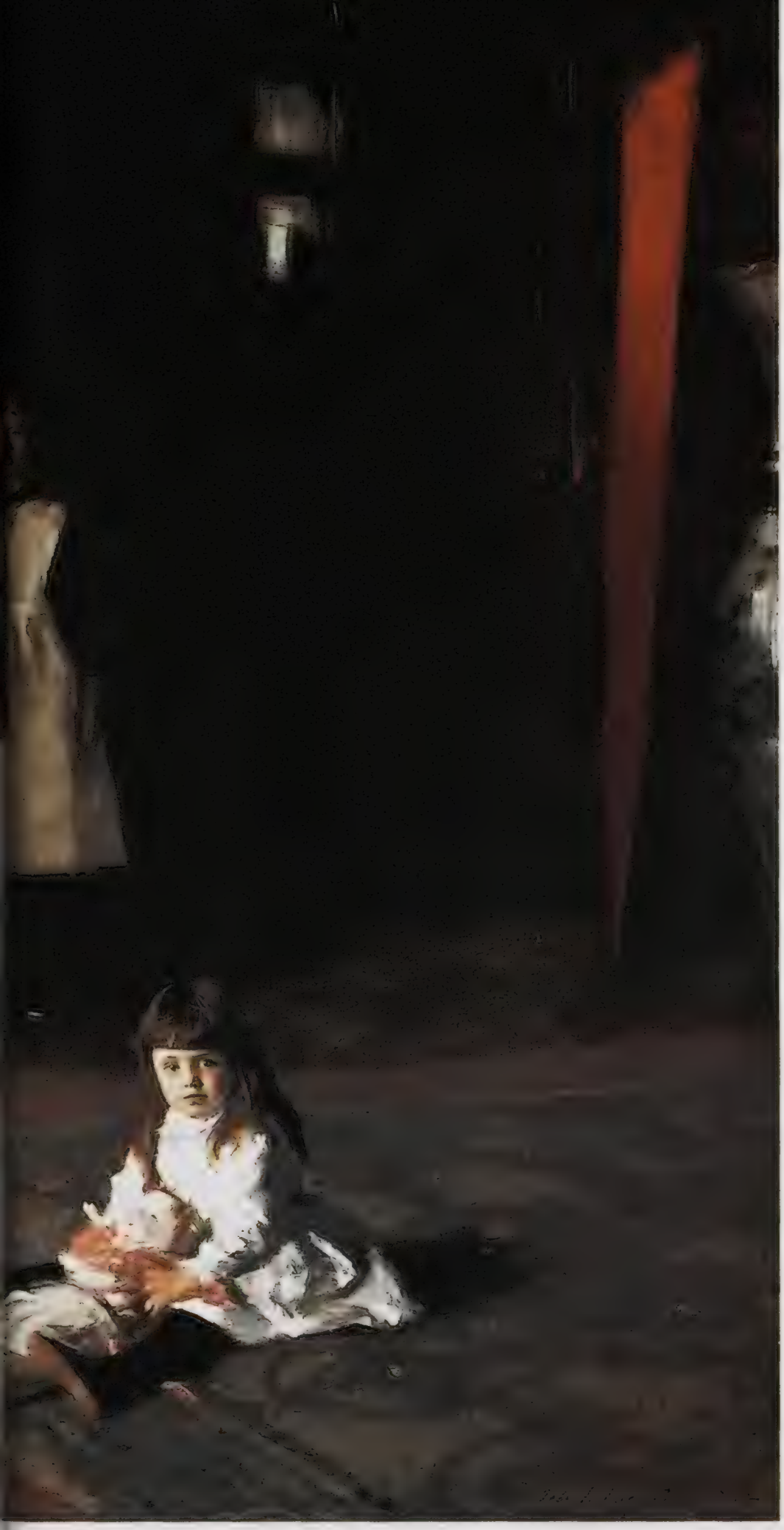
ON MY FIRST VISIT TO THE NATIONAL Gallery of Art in Washington nearly 40 years ago, I discovered *Street in Venice*, a small wondrous painting by John Singer Sargent. Unlike most popular paintings of Venice, this one showed no gondolas or canals or churches. Instead, a young woman in a black shawl walked down a darkened inner street, the hem of her long, white dress flapping at her toes, while two angular men in cloaks and hats talked in the shadows, one turning from the conversation to spy the passing woman.

I had no idea then that this artist who was capable of capturing street life so vividly was also the most sought after portrait painter of high society in both the United States and Britain at the turn of the 20th century. I simply assumed wrongly that Sargent must be an artist well known for realistic paintings of dark moods and piercing insight. My ignorance would have pleased him very much.

Sargent made his fortune and reputation as a portrait painter of beautiful women and influential men. Presidents Woodrow Wilson and Theodore Roosevelt, oil tycoon John D. Rockefeller, novelists Robert Louis Stevenson and Henry James, actress Ellen Terry and art patron Isabella Stewart Gardner all sat for him. Yet the immensely talented Sargent devoted as much energy to landscapes, figure paintings, genre scenes, World War I memorials and grand murals in Boston, almost all wrought in great beauty and drama. He sometimes mocked his lucrative success in portraiture, and hoped and expected that history would recognize him even more for the rest of his work.

Now, for the first time, Americans have a chance to measure Sargent on his own terms. Prepared by the Tate Gallery in London, a new and unprecedented exhibition offers a broad spectrum of Sargent's works, from the portraits to the landscapes to the sketches for the murals. "This is the full Monty. . . the absolutely quintessential Sargent," says Richard Ormond, who is a leading scholar of the painter, his grandnephew and one of the principal curators of the show. After three months in London, the exhibition opens at the National Gallery of Art in Washington on February 21 for a stay until the end of May. It moves to the Museum of Fine Arts in Boston on June 23 and closes there September 26.

The large Sargent exposition is attracting satellite exhibitions that will excite even more interest in the American painter. In Washington, the Corcoran Gallery of Art will show 60 of the more than 100 Sargent drawings in its collection, most donated by the artist's sisters. Boston will become a Sargent festival city for the occasion. The Museum of Fine Arts has been cleaning and restoring its Sargent murals for almost a year. All of Sargent's other murals can be seen in Boston as well. In addition, the city's Isabella Stewart Gardner Museum permanently displays a spectacular canvas absent from the main show—*El Jaleo*, Sargent's portrayal of a fiery gypsy flamenco dancer in a Spanish café—and will mount a special installation of Sargent land-



MUSEUM OF FINE ARTS, BOSTON

The unusual composition, emphasis on empty spaces, and geometric format of *The Daughters of Edward Darley Boit* (1882) owe a debt to Velázquez's *Las Meninas* of 1656. The all-enveloping space and towering vases give the canvas an aura of mystery.

scapes while the main retrospective is on view at the nearby Museum of Fine Arts.

Although an American, John Singer Sargent did not even see the United States until he was 20. He was born in Florence on January 12, 1856. His mother, an amateur artist, had persuaded her husband, a Philadelphia doctor, that her sickly constitution required the healing climes of Europe, and she would never, in fact, feel well enough to return home except for an occasional visit. Her son remained an expatriate for the rest of his life, making only ten trips to the United States.

The young man learned to speak French, Italian and German as the family flitted to southern European cities like Florence, Rome and Nice to escape the cold, and to resorts in the Alps, the Pyrenees and elsewhere to escape the heat. His parents educated him mainly at home and soon noticed he possessed a prodigious talent for drawing. When John was 18, the Sargents decided to worry less about Mrs. Sargent's perennial illness and more about their son's future. They moved to Paris, unrivaled then as the art capital of the world.

Young Sargent captured the attention of the Paris art establishment in just a few years, a remarkable achievement for an American. He quickly became the star pupil in the atelier of Carolus-Duran, a fashionable portrait painter. A fellow student lamented in his diary that Sargent's work "makes me shake myself." By the time he was 22, Sargent felt ready to take on the Salon—the annual showing of what Parisian authorities regarded as the world's finest paintings.

With his gentle, sometimes diffident manner, Sargent made no attempt to mimic the flamboyant bohemian artists of Paris. Photographs show Sargent as a tall, pleasant young man with a trimmed beard, invariably wearing a cravat and waistcoat. Although described throughout his life as reserved and shy in public, friends found him charming. A woman whose family Sargent visited when she was 9 and he 23 recalled years later that "he was so youthful, so lively and good-humoured that he enchanted the whole household." Sargent, she went on, "was tireless, ready to climb any mountain. . . , to carry the picnic basket, to dance a jig and to sing negro spirituals while accompanying them on a banjo very expertly."

Sargent would try each year to offer the Salon judges a striking portrait plus an unusual painting of some exotic scene based on his travels to Spain, North Africa and elsewhere. He regarded himself as avant-garde, and intended to impress the judges and critics with his daring and dazzle. But he did not want the shock to be so great as to repel. Aiming at the Salon, he produced a spectacular array of exciting and masterful paintings while only in his 20s.

The strategy worked at first. He won a medal for a por-

Overleaf: The infamous *Madame X* caused a stir when it was shown at the 1884 Salon. The subject's extravagant décolletage, icily erotic beauty and haughty air scandalized the viewing public.

Softened by the reflections of the water, the architectural forms in Sargent's c. 1907 watercolor *On the Grand Canal* (left) seem to dissolve in the light of the lagoon. Poetic in mood and aesthetic in conception, *Cashmere* (below) was painted in the Italian Alps. The model for all seven figures was the artist's niece Reine Ormond.

trait at the 1881 Salon. He joked to a friend that this had made him "a great swell." A year later, when he showed both *El Jaleo* and a seven-foot-high portrait known as *Lady with the Rose*, a critic called him "one of the lions of the Salon." Henry James described the haunting *Daughters of Edward Darley Boit*, exhibited in the 1883 Salon, as astonishing in "the sense it gives us as of assimilated secrets and instinct and knowledge of playing together." In a celebrated 1887 *Harper's* article summing up these years, James wrote that Sargent's early paintings offered "the slightly 'uncanny' spectacle of a talent which on the very threshold of its career has nothing more to learn."

But Sargent overestimated the tolerance of the Paris establishment. He decided to paint a portrait of 23-year-old Virginie Gautreau, an American from Louisiana who was married to a wealthy French banker and shipowner. The extravagant Madame Gautreau was a beautiful woman

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Group with Parasols (A Siesta) from 1905 (left) was painted during one of Sargent's summer expeditions. The expressive brushwork, suppression of detail and concentration on surface texture give the painting a decidedly modern feel. *The Fountain, Villa Torlonia, Frascati, Italy* (above) was one of a series of the villa done in 1907. Here, Sargent's friends artists Jane and Wilfrid de Glehn provide a romantic counterpoint to the historic grandeur of the grounds and fountain.

A popular and critical success when it was exhibited at the Royal Academy in 1887, *Carnation, Lily, Lily, Rose* combines aspects of Impressionism with more accessible, established traditions.

with sharp features, heavily powdered skin and a taste for low-cut bodices. Rumormongers hinted that she was frigid; others maintained she had a lover. Sargent persuaded her to sit for him but found the actual painting difficult. He told a friend he was "struggling with the unpaintable beauty and hopeless laziness of Madame G."

The portrait scandalized the 1884 Salon. Madame Gautreau's bare shoulders, overflowing bosom and haughty manner seemed like a flagrant attempt to defy society. Women gathered around the painting to jeer. "Never have we seen such a downfall of an artist who once seemed to excite so many expectations," wrote the critic Jules Comte. Sargent had painted one of Madame Gautreau's shoulder straps slipping down her arm. That prompted the critic in *Le Figaro* to jibe, "One more struggle and the lady will be free." The young woman's mother marched on Sargent's studio and demanded that he withdraw the painting. "My daughter is lost," she cried. "All Paris will mock her."

After the Salon closed, Sargent repainted the portrait to put the errant strap back in place. When he sold the painting, which became known as *Madame X*, to the Metropolitan Museum of Art in 1916, he wrote to the director, "I suppose it is the best thing I have done." But the picture and the scandal it evoked crippled his hopes of establishing himself as a portrait painter in Paris.

Friends believed he came close to marriage during the Paris years. In the summer of 1881, when he was 25, Sargent seemed to court Charlotte Louise Burckhardt, the pretty 18-year-old Swiss-American he painted as the petulant, coquettish *Lady with the Rose*. Encouraged by her mother, he escorted the young woman about Paris and accompanied her on chaperoned excursions to the French countryside. But his ardor cooled, and his artist friend James Carroll Beckwith noted in a diary a year later: "We have had a long talk on the Louise affair. I am sorry for her but he does not care a straw for her, poor girl." Sargent would remain a bachelor for the rest of his life.

Taking up the question of whether Sargent had "physical relations with either sex," Sargent scholar Richard Ormond writes in the exhibition's catalogue: "If he had sexual relationships, they must have been of a brief and transient nature, and they have left no trace. The answer is that we simply do not know, and decoding messages from his work is no substitute for evidence."

Encouraged in part by Henry James, Sargent moved to London in 1886, later settling into the Chelsea studio that once served James McNeill Whistler. Explaining the move to a colleague, Sargent wrote, "There is perhaps more chance for me [in London] as a portrait painter, although it might be a long struggle for my painting to be accepted. It is thought beastly French."

Sargent made his first major impact in England not with a portrait but with *Carnation, Lily, Lily, Rose* (left), a scene of two young girls in white dresses lighting Chinese lanterns amid the flowers of a garden at dusk. He painted it while working on landscapes at a writers-and-artists' colony in the village of Broadway in the Cotswolds in southwest England. To catch the light correctly, he would halt his afternoon tennis match each day and paint the children posing in the garden for just a few minutes at dusk. The picture, titled after a popular song lyric, took two summers to complete. Shown at the annual exhibition of the Royal Academy of Arts in 1887, the painting was so popular that the British government bought it.

But Sargent was more intent on inducing clients to commission portraits, the surest way of an artist's earning a handsome income and reputation. His breakthrough came when he was invited to America in the fall of 1887 to paint the wife of a prominent New York banker. Following that commission, Sargent found an accelerating demand for his portraits in the United States. The Americans, Ormond says, looked on him as "the native son returning" and thought he had "European chic with a vengeance."

In Britain, Sargent's portrait of *Lady Agnew of Lochnaw* (see cover), which was shown at the Royal Academy in 1893, excited critics and potential customers and catapulted him, at the age of 37, to the highest rank of portrait painters in both Britain and the United States.

Fumée d'ambre gris was begun in the Moroccan town of Tetuan and finished in Paris for the 1880 Salon. "The picture is exquisite," wrote Henry James, "a radiant effect of white upon white."

CLARK ART INSTITUTE

Based on a scene Sargent witnessed at Le Bac-du-Sud, following a German retaliatory attack on the British Army in August 1918, *Gassed* makes use of the processional form to give spiritual weight and meaning to the composition.

Portraits now dominated Sargent's life. Old aristocrats and the new rich, especially the women, wanted to sit for him. A famous cartoon by the caricaturist Max Beerbohm shows a line of dowagers, fashionable ladies and hotel bellhops saving places for distinguished visitors outside Sargent's London Tite Street studio while an apprehensive Sargent watches from his window. In 1894, his portraits led to his election as an Associate of the Royal Academy, evidence, he said, of his having "more of an affinity with old fogies than I expected." By the late 1890s, Sargent had raised his fee for a full-length portrait to a thousand English guineas, the equivalent of about $100,000 today. He painted more than 800 portraits in his lifetime.

Sargent made no attempt to satirize the high society that wanted him to assure its veneration. This led some critics to regard him as superficial. Sargent himself lamented that "very few writers give me credit for insides so to speak." Yet Sargent regarded Spain's Diego Velázquez and Holland's Frans Hals as his masters, and his portraits at their best crackled with psychological mystery, offering a good deal more than meets the eye, as if the sitter could somehow fit into the shadows of a Henry James story.

His subjects described posing for Sargent as a strange experience. He would step back and rush forward continually to dab at the painting, trying to see both the sitter and the canvas from afar, muttering, "Demons, demons," if he did not like his work. When he reached an impasse, he would sing or play the piano, sometimes in a duet with the sitter or the sitter's family.

After ten years, Sargent began to weary of the portraits and their incessant demand on his time and energy. He had agreed in 1890 to paint a series of murals for the Boston Public Library and believed they would produce a greater artistic legacy for him than the portraits. His letters began to mock the source of his main income as "paughtraits." He complained often. "What a nuisance having to entertain the sitter and to look happy when one feels wretched," he said.

In 1907 he announced that he would no longer paint portraits, "that he was shutting up shop in the portrait line." "I abhor and abjure them and hope never to do another especially of the Upper Classes," he wrote one friend. He told another, "It is to me positive bliss to think that I shall soon be a free man."

Sargent had returned to summer landscape painting even earlier, and the new freedom intensified his new devotion. He began a series of joyous excursions to the Continent with family and friends, many of whom were equipped with paints or watercolors. He would break off every year from the murals and an occasional portrait (forced on him despite his self-imposed ban) in London and spend three to four months of the summer and early fall on landscapes and outdoor figure painting. He and his entourage would explore the mountain passes of the Alps and then move on to Venice and finally, perhaps, to a beautiful southern site like the Spanish island of Majorca.

Sargent looked on these trips as his holidays from the studio, but worked all day anyway. He expected most of his companions, including the children, to either draw for themselves or pose for him. Ever theatrical, Sargent would bring along special clothing—oriental costumes, for example, or a long cashmere shawl—for his models. Starting work at 8:30 A.M., he usually set up umbrellas to protect him from the wind, sun and reflection while he painted. He sometimes dropped his jacket in the heat but always kept his waistcoat and cravat on.

At lunch and dinner, he presided over a long table at the local hotel. "Always good tempered, though usually rather silent," reported painter Adrian Stokes after joining a Sargent excursion to the Simplon Pass between Switzerland and Italy, "he listened to the general conversation, interposing, here and there, a humorous or caustic remark." An evening of chess frequently followed dinner, with bedtime at 10 P.M.

Sargent searched for waterfalls, mountainsides, chalets, streams and fountains to paint, often posing his compan-

IMPERIAL WAR MUSEUM, LONDON

ions in the foreground. He completed 1,500 landscapes and figure paintings, both oils and watercolors, during his lifetime. Critics sometimes described him as a "British Impressionist," but Sargent, though a friend and admirer of Claude Monet's, was too concerned, even in his watercolors, with delineating detail to count as a true Impressionist.

The joy of these summer excursions is reflected in *The Fountain, Villa Torlonia, Frascati, Italy*, Sargent's 1907 painting of his artist friends Wilfrid and Jane de Glehn in the gardens of the Villa Torlonia outside Rome. Jane, dressed in white and perched on the corner of a balustrade, is painting the fountain that we see in the background while a smiling, languid Wilfrid looks on. "Sargent is doing a most amusing and killingly funny picture in oils of me. . . ," Jane wrote a friend. "It is the very 'spit' of me. . . I look rather like a pierrot, but have rather a worried expression as every painter should have who isn't a perfect fool, says Sargent. Wilfrid is in short sleeves, very idle and good for nothing, and our heads come against the great 'panache' of the fountain."

Despite his sophistication, Sargent, who rarely read newspapers, knew little about world politics. When World War I erupted in 1914, he and several British friends were caught in the Austrian Tyrol. Sargent carried no passport, and since Austria and Britain were now at war with each other, Austrian police delayed the departure of the suspicious party. Sargent kept working while waiting. "We are painting away while Rome is burning," he wrote a friend. But Sargent, according to his companion Adrian Stokes, took no interest in the war. "He seemed to regard the whole grim affair simply as an example of human folly," Stokes later recounted. It took almost four months before Sargent, with the help of the American ambassador in Vienna, could make his way back to London.

In 1918, Lord Beaverbrook, the newspaper tycoon who ran the British Ministry of Information, persuaded Sargent to paint war pictures at the Western front. "I hope to have the chance of being well scared," Sargent wrote his patron Isabella Stewart Gardner. Approaching battle with incredible naiveté, he is said to have muttered to a general, "I suppose there is no fighting on Sundays." American troops had to ask him to camouflage his white sketching umbrella. When he returned to London, Sargent produced the 20-foot-long *Gassed*, an enormous panorama of soldiers, blinded by mustard gas, heading to a medical station for treatment while other maimed victims writhe nearby.

This canvas, which is being exhibited for the first time in the United States, was voted the picture of the year by the Royal Academy in 1919. But, in a devastating essay six years later, the British novelist E. M. Forster derided it for idealizing war. He said Sargent had "managed to tell a new sort of lie" by reassuring all those "who fear that Romance is passing out of war." Yet Sargent described the gassed soldiers on the front as "a harrowing sight," and his charcoal sketches of the broken young men, shown in the Corcoran exhibition, foster a poignant mood. New American viewers will probably still experience strong emotions about the cruelty of war when they come upon *Gassed*.

After World War I, Sargent devoted himself primarily to his murals for Boston. Following the customary practice in those days, he painted the murals on canvas in his studios in England and Boston before craftsmen attached

Perseus on Pegasus Slaying Medusa (1922-25) is one of the panels Sargent painted for the stairway of the Museum of Fine Arts in Boston. Here Perseus presents Medusa's head to Athena.

them permanently to the walls with a lead-based paste. He believed that creating the murals put him in the tradition of great Italian artists of the Renaissance.

Sargent worked on the Boston Public Library mural, *The Triumph of Religion*, for almost 30 years before shipping his last section to the library in 1919. The mural, which filled the third-floor hall leading to the Special Collections room of the library on Copley Square, attempted to tell the story of the development of Western religion, from pagan gods like Moloch to the Jewish prophets to Christianity. The most impressive section is a friezelike panorama of Moses and 16 prophets, all painted in a style reminiscent of a Velázquez portrait. The Boston establishment hailed each section as a grand masterpiece.

Nonetheless, Sargent provoked a good deal of controversy in 1919 with his portrayal of a symbolic figure called "Synagogue" collapsing and losing her crown. Jewish organizations protested that this turned the mural into the triumph of Christianity, not religion, and demanded in vain that authorities remove it from a public building. The artist did not understand the protest, believing he was only re-creating the traditional narrative set down by the great art of Europe. "I am in hot water with the Jews," Sargent wrote his biographer, Evan Charteris, in 1921. There was some irony in this, for anti-Semites in Britain had often derided Sargent for making his portraits of Jewish patrons and their children too attractive.

In 1916 he received a commission to paint the rotunda over the staircase at the entrance to the Museum of Fine Arts in Boston and in 1920 to paint a pair of murals at the Widener Memorial Library at Harvard University. He completed the Widener murals—symbolic representations of American intervention and victory in World War I—in a couple of years. But the museum murals occupied him for the remainder of his life.

These murals are derived from Greek mythology and depict gods and goddesses, like Apollo and Athena, and heroes, among them Hercules and Atlas, often in scenes related to art, such as the panel in which Athena protects the figures of Painting, Sculpture and Architecture from the ravages of the scythe of Time. When he completed the last of the murals for the Museum of Fine Arts, Sargent told his friend Stokes, "Now the American things are done, and so, I suppose, I may die when I like." On April 14, 1925, he attended a farewell party in London before his scheduled sailing to Boston to supervise the installation of the final sections of the murals. He died in his sleep that night at the age of 69.

After his death, Sargent's reputation declined rapidly. The world of modernism passed him by. While alive, he never could fathom painters of the new currents in modern art. But they became the vanguard in the 20th century, while he was relegated to a place with the old fogies. The British critic Roger Fry, an apostle of modernism, wrote of him in 1925, "That Sargent was taken for an artist will perhaps seem incredible to the rising generation."

That attitude ruled for many decades as the art world embraced Picasso and Cubism and Surrealism and Expressionism and Abstraction, and dismissed Sargent as a society painter. But a new tolerance has come in recent years toward giants of the past. As our century comes to a close, it is possible to shake off many of the biases of modernism and accept an artist like Sargent for what he is—an extraordinarily talented and dramatic painter who never dared too much but always infused his work with the excitement of intense beauty.

Stanley Meisler, a former foreign correspondent for the Los Angeles Times, *last wrote for* SMITHSONIAN *on artist Pierre Bonnard.*

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"Lay it up!"

WHERE THE MAPLE River winds through the frozen flatlands of southern Minnesota, it's hard to find a straight patch of ice, let alone a smooth one. Just the thought of playing a game here in midwinter chills me to the bone. Yet in the 1850s, Scottish immigrants brought stones and brooms to this river. They swept off the snow and scratched circles on the ice. Salting their speech with "Hie, laddie," "oot" and "aboot," they sent the stones skittering along the glassy surface. When they ran short of stones, they slid their wives' flatirons between the banks. Warming themselves with a nip of something here and a swig there, they kept score. They kept a community together. And they kept an old game alive in their young farm town.

Several generations later, on a snowy Tuesday night, about a

BY BRUCE WATSON

Curling Is Chess on Ice, with Broomsticks

hundred people are gathered at the Heather Curling Club in Mapleton, Minnesota (pop. 1,526). Outside, bitter winds whip across the fields. More snow is expected. The air frosts noses inside and out. But inside, small-town ties warm the pine-paneled rink. Coming out of the cold, men and women trail clouds of steamy breath. They stamp snow off their feet, hang coats in the cloakroom and settle in for the evening. Talk is of the weather, of course, and of next week's Burns Bonspiel, Mapleton's annual celebration of its Scottish heritage. In one corner, burgers sizzle on a grill. Nearby, Larry Barott checks the evening's league schedule on the bulletin board. Out on the rink, Jeff Annis patiently planes the ice with a portable Zamboni. Then at 6:30 P.M., the ice begins to roar, and the sound of sliding stones competes with the con-

PHOTOGRAPHS BY LAYNE KENNEDY

On the ice at the Heather Curling Club in Mapleton, Minnesota, Jeff Moore (left) shows his teammate where to aim the shot.

stant chatter of curling. "Up! Up! Soop 'er up!" "Take 'er out, Cathy!" "Remember, we've got the hammer!" "Off the broom!" "Lay it up just past that hog line!"

Crouching at a starting block, or "hack," a woman holds a teapot-shaped hunk of granite by its metal handle. Concentrating, she pushes off. Then, gliding along the ice with amazing grace, she releases the stone with the subtlest twist of her hand. Now, the hunk of granite wobbles along under its own power. At the call of "Sweep!" (or, "Soop 'er up!") two players frantically sweep the stone's path. As if flouting the laws of physics, the stone hooks around one granite teapot, clicks against another and comes to rest inside a red, white and blue bull's-eye far down the ice. The "skip," or team captain, raises her broom. "Good rock!" she shouts. And more than four centuries after the game was invented, another curling match has begun.

Across the world's frostbelt, more than a million people go curling each winter. The vast majority curl in Canada, where the game takes a back-seat only to ice hockey. Yet here in our own land of big brawny sports played for big bucks, curling is a novelty, a sports trivia question, a joke. "Curling?" curlers are asked again and again. "Isn't that a kind of weight lifting?" But sliding their stones on "sheets" scattered primarily across the Northern-tier states, America's 15,000 curlers play with a devotion other athletes can only envy. Weekends from October to April, teams pile into station wagons and drive hours to the nearest curling tournament, called a "bonspiel." There they slide stones all weekend, sharing beer and sandwiches with old friends. They plan winter vacations around curling's national championships, held in places like Bismarck, North Dakota, and Hartland, Wisconsin. When the ice is "keen," curlers will not let anything dampen what they lovingly call "the spirit of curling." To understand that spirit, you have to consider what curlers do just to get to the ice.

On a January day several years ago, it had been snowing since dawn in Mapleton. A foot and a half of fresh flakes lay on roads and fields. By evening, winds lashed at the prairie. A great Northern whiteout was under way. But Minnesota's southern district finals were slated for the Heather Curling Club that night. So Larry Barott, a burly man with a blond beard, trudged to his car and set out into the whiteness. "It was crazy," Barott's wife, Carrie, recalled. "You couldn't see the road. You couldn't

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Curlers play with a devotion other athletes can only envy. . . . When the ice is "keen," they will not let anything dampen "the spirit of curling."

Jeff Annis (above) releases the stone during the last few feet of his slide; Nick Myers and Janet Wooden (right) sweep the ice ahead of a sliding stone to help it travel farther and in the right direction. Nick has "shined up a bit," as curlers put it, and is wearing his plaid. Using a measuring stick, Moore (below) determines which stone ended up closer to the tee.

see anything. I was like, 'No way we're going curling tonight.' But Larry said, 'No problem. We'll get there.'"

Barott's old Camaro careened like a stone itself as it approached the curling club. Soon he saw the lights of the rink. Skidding into the parking lot, he stumbled through drifts to the front door. Inside, burgers were on the grill. Folks, some having come by snowmobile, calmly perused the night's matchups on the bulletin board. And dozens of other diehards were already on the ice. The blizzard continued throughout the two-hour competition. Barott's team won the district finals and the right to play in the state meet in St. Paul. When it was all over, several curlers slept in the rink. The Barotts had to put up at the nearest farmhouse until snowplows came the next morning. But it had been "good curling."

"Good curling." Whether the ice is in Owatonna, Minnesota, or Belfast, Maine, players shake hands before each match and share this simple entreaty. In these days of rude sports played by overgrown babies, curling remains the most civilized of games. Its etiquette dates to a time when courtesy was king. Most modern sports were invented in the last century, but curling goes back at least as far as the 1500s. No one knows who cast the first stone, but it was most likely thrown on a frozen loch in Scotland. Amidst the boredom of winter, chucking "stanes" became the Scots' natural pastime. By the 1700s, curling was the hottest sport on ice.

Gaze deeply into *Hunters in the Snow* by the Dutch master Pieter Bruegel. There on the ice far behind the hunters, peasants—armed with broomsticks and surrounded by stones—are curling. Some use Bruegel to lay a Continental claim to the game's origin, but loyal Scots will hae none o' tha', lad. Wasn't the oldest known curling stone, dated 1511, found in Scotland? And didn't Scottish curling clubs, formed in the 1700s, turn the raucous fun of sliding stones into a game of manners? One club's bylaws proclaimed: "There shall be no wagers, cursing or swearing, during the time of game under the penalty of Two Shillings Scots for each oath." Others forbade discussing "politics of church or state" while curling, and declared "whiskey punch to be the usual drink of the club in order to encourage the growth of barley."

Curling's customs changed with the centuries. Scottish soldiers brought the game to North America during the French and Indian War, and it was taken up in earnest in the 1800s by clubs in Milwaukee, Detroit and New York City. In 1838, Edinburgh's Royal Caledonian Curling Club standardized rules for all curlers in Scotland. By the time those pioneers began sweeping the ice on the Maple River in the 1850s, curling had evolved into a duel of skill and finesse.

Like many, I mistook curling for shuffleboard or boccie on ice. It looks so simple. I'd just slide a stone toward the bull's-eye. If another got in my way, I'd BLAST it out of there! Whoa, nailed that baby! Hie, me bonnie lass! The Watson clan hae the game in its blood!

But then I came to Mapleton, a

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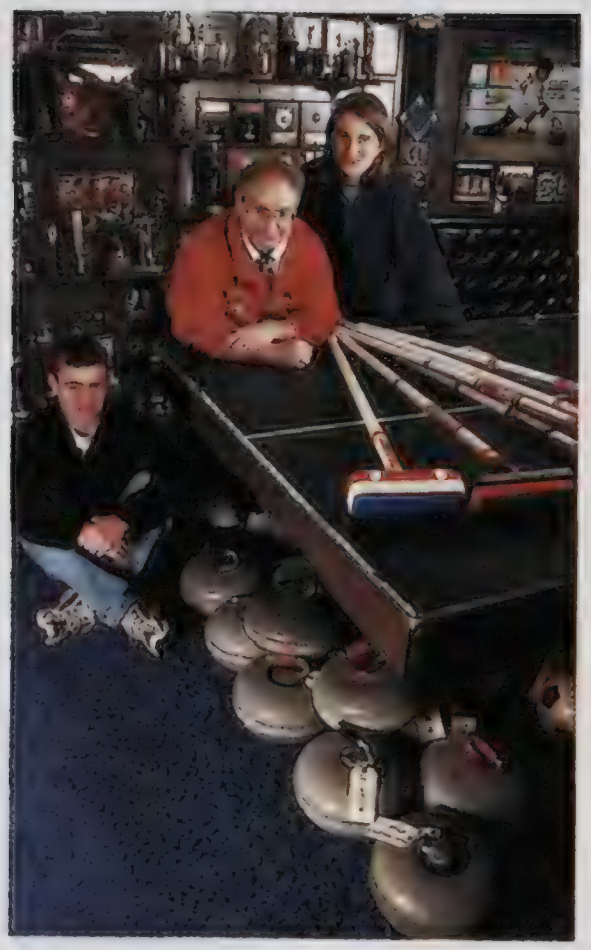

Left: Steve Brown, with his son, Craig, and daughter, Erika, shows equipment for sale at the store in his Madison, Wisconsin, home. Right: Heather Curling Club members form a stone shape outside the rink.

farm town two hours south of the Twin Cities. Like many proud Midwestern communities, this one greets you at its city limits. "Welcome to Mapleton," a sign proclaims. "The curling capital of Southern Minnesota." This is no idle boast. Only a few dozen silos down the road, in Amboy and Winnebago, curling hasn't the slightest cachet. But in Mapleton, it's as much a part of the town as are grain elevators or the hearty cheeseburger soup shared over coffee and gossip at LynDel's Cafe. Down at Thistles & Plaid, Kay Solie sells Scottish memorabilia, including curling souvenirs and the Heather Curling Club cookbook. In spring, folks here root for their high-school baseball team. In summer, they follow the Twins. In fall, their attention shifts to the University of Minnesota's Golden Gophers on the gridiron. But when the crops are in and the fields are frozen, the Heather Curling Club is open five nights a week. This one little dot on the plains has sent a dozen curlers to national meets and hosted major bonspiels back home. In big cities, curling clubs keep elaborate records of teams and matches, but in towns like Mapleton, curling is carved into family trees.

Mary Duncanson, still an active curler at 71, recalls the night she was playing in a mixed bonspiel, men and women sharing the ice. Duncanson looked across the town's rink and saw the generations unfold. Her husband was sweeping on one sheet. Her nephew was in the hack on another. Her son was the skip on a third sheet, and she, proud matriarch of a curling clan that also includes grandchildren learning the game, was in her own match. "These days Duncanson is a name synonymous with curling in Mapleton," she told me. And suddenly I felt a little sheepish. I had come to this curling capital expecting to slide a few stones. Now I was learning the true spirit of curling. Pretty soon I would learn some of the game's frustrations.

The Heather Curling Club, open five nights a week, has sent a dozen curlers to national meets and hosted major bonspiels back home.

On Wednesday morning, when the ice was empty, came my turn in the hack. Handing me a broom and a stone, Larry Barott patiently gave me my first curling lesson. He seemed to be speaking English, but it was hard to be sure. In other sports, a "hack" is the guy you don't want on your team. A "pebble" causes a bad hop on a ground ball. "Tee" is what you set

your golf ball on, and "end" is what happens after the fat lady sings. But curling has its own singular jargon. According to Barott, I'd merely push off from the "hack." I'd slide toward the "hog line" and release my stone with a delicate "in turn." If I gave the stone "good weight," or good speed, it would "ride the pebble," the thin layer of frozen drops of water that had been sprinkled on the ice. A "good rock" would "lay up" near the "tee," the center of the target area, or "house," which looked about three miles away. A curling team has four players, Barott explained. Each player throws two stones per "end," like a baseball inning. In each end, only the

In their Mapleton store, Kay Solie and son Tim emphasize Scottish and curling items.

team whose rocks are closest to the tee is awarded a point for each. Games last eight or ten ends, depending on the level of competition. If the game is tied, it goes into extra ends. All set? Then "good curling!"

Making sure no innocent bystanders were in danger, Barott let me throw a few stones. Forget boccie and shuffleboard. For sheer frustration, curling reminds me of that other Scottish torture called golf. Both demand a surgeon's sense of millimeters and a bombardier's feel for distance. A curling stone weighs 42 pounds, and the sheet is more than twice the length of a bowling alley. This called not just for good weight but great weight. I sent my first stone zipping past the house and off the ice. Had the rink's wall not been sturdy, my stone would have stopped somewhere in the fields along Route 1 near Mary Duncanson's farm. Overcompensating, I made my second throw a lightweight. It skidded to a stop halfway down the sheet. The slightest twist of my hand sent a stone hooking like a badly hit 2-iron. A turn in the other direction caused the stone to slice. *Twice* in my half-hour lesson, I managed to lay a stone inside the house. But curling one stone around another and stopping it on the tee seemed as impossible as threading a needle with a rock. Throw in an intricate strategy of "guards" and "takeouts," and curling was as maddening as several other sports I'd given up. But I had only scratched the frozen surface of its conundrums. Later, Jeff Annis told me about the game's deeper frustrations.

The site was Duluth, Minnesota, in 1997. Curling, four times a demonstration Olympic sport, was to be one of the newest gold medal competitions at the 1998 Winter Games in Nagano, Japan. America's best curlers had gathered in Duluth for the Olympic trials. Annis, a rugged, clean-cut Mapleton High coach whose ancestors started the town's first curling club, had taken the family game to heart. After more than 20 years on the ice, he had reached a threshold. His team needed a win to stay in the running for Nagano. Standing in his way was Tim Somerville. Somerville is the son of curling's Babe Ruth, Raymond H. "Bud" Somerville of Superior, Wisconsin. It was the elder Somerville who brought home America's first world curling title in 1965 and then dominated the stateside game for nearly 30 years. Yes, sports fans, there is a U.S. Curling Hall of Fame, a small museum at the Chicago Curling Club, and Somerville was its first inductee. Now Bud had passed the stone to son Tim.

Dueling through a double round-robin tournament, Annis' team battled Somerville's in a key game. The

A lively 1835 painting of curlers by Sir George Harvey, a president of the Royal Scottish Academy, shows that competitiveness and intensity are not peculiar to modern times.

score was tied with one end left to play. With one stone to go, Annis' team had the rock closest to the tee. Then came the "hammer." This final throw of each end is curling's heartbreak shot, and in Duluth the hammer was Somerville's. His stone rumbled down the ice and stopped beside the other. In a game of millimeters, this one was too close to call by eye.

When their beloved sport finally struck Olympic gold last year, many curlers hoped TV coverage would clear up the confusion. American teams weren't expected to win any medals, but if the folks back home could just *see* the sport, they might stop mistaking it for weight lifting. If you don't know the game, curling on TV is about as exciting as watching paint dry. But if you understand the strategy, curling earns its nickname: "chess on ice."

It goes back at least as far as the 1500s. No one knows who cast the first stone, but it was most likely thrown on a frozen loch in Scotland.

Officials measured the stones' positions with a caliper-like device. By a broom-hair's breadth, the stone, the game and ultimately the match went to Somerville. Team Somerville went to Japan; Annis went back home to Mapleton. "Better not to think about it," he told me with a shrug typifying curling's gallant spirit. He would have to watch Olympic curling on TV.

In Nagano, the American women finished fifth, but the men put on a show. After losing several games, they rallied. First they upset Britain 6-3. Next they topped Sweden 5-2 and Japan 5-4 in overtime. Going into the semifinals, the U.S. team still had a chance for gold. On a Saturday evening in prime time, they were to play the powerhouse Canadians, with the winner advancing to the final. Across America's curling belt, loyalists tuned in CBS' Olympic coverage and saw . . . figure skating. And more figure skating. CBS devoted only a few minutes of coverage to curling during the entire Olympics. As it turned out, the men lost to Canada, and then, vying for the bronze, they succumbed to Norway.

In curling competition, each skip "reads" the ice, noting its banks and turns. The pebble of a curling sheet changes as stones slide across it. As the competition heats up, players time each stone with a stopwatch, and curlers adjust their weight accordingly. Misread the ice and you'll call "sweep" when none is needed. The sweeping, silly as it looks, removes debris that could send a stone awry. More importantly, it also warms the surface, creating a hydroplane-like effect beneath the granite. Sweeping can send a stone straighter and up to 15 feet farther

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than it might have traveled on its own. Yet with top curlers putting 75 percent of their stones almost exactly where they aim, there is no substitute for strategy. Curling's tactics are as convoluted as its jargon. Curlers joust and duel with stones. They protect their best throws with guards placed in front of the house. Like billiards players, they execute carom and double carom shots. Countless strategic fine points make for a game so exacting it can become an obsession. Steve Brown caught the fever as a boy in Galesville, Wisconsin. He never imagined one day it would cost him his job.

A decade ago, Brown, a diminutive but intense athlete, took a three-month leave from his job as an insurance underwriter. Sorry, he said, but he had another assignment—as a curling coach. Curling was a demonstration sport at the Calgary Olympics, and Brown's 15-year-old daughter Erika was a member of the team coached by her dad. When Brown came home from Calgary, his boss gave him an ultimatum. He could keep curling, coaching and competing in bonspiels. Or he could keep his job. He could not do both. Brown didn't hesitate. Now he ekes out a living from "cashspiels"—bonspiels with small cash prizes—and by running the nation's largest curling store.

In Brown's Madison, Wisconsin, home, an entire rec room is stacked with scrapbooks, trophies and curling souvenirs. Steve and his wife, Diane, have each won national championships. Last year, Steve was inducted into the U.S. Curling Hall of Fame. Son Craig was on the Wisconsin team that won the 1998 Mixed National Championship. Daughter Erika, six-time junior national champ, competed in Nagano, coached again by her dad. And from their basement, the Browns run Steve's Curling Supplies. Need a good hogs' hair broom? Ask a sporting goods dealer and he'll send you to a hardware store. But Steve's has 20 kinds of brooms and several varieties of Teflon sliders that slip onto one shoe, allowing the curler to slide down the ice. Steve's also sells curling jewelry—pins and bracelets shaped like brooms and stones—as well as notepads, a computer curling game, even curling trading cards. Stacked in one corner are the curling stones, hewn from granite quarried on a Scottish isle. A set of 16 sells for $5,000 and lasts forever. Curling clubs buy stones and brooms for their members, making curling a thrifty sport. Buy a slider for $15, or some curling shoes for $50 to $120, and you can step into the hack. Thrift is not just another Scottish tradition. Curling has to be done on the cheap because even top curlers like Steve Brown have a hard time turning pro.

"The first few years were really tough," Brown told me. "I gave up 17 years of benefits and raises. But we expanded the curling store and somehow made it work. I just love the competition of curling. There was no way I was going to give it up." Competition, chess, family and friends. Obviously curling is more than stones on ice. It's a lifetime game, one in which a team can include a 7-year-old and a 75-year-old. Curling's stones are unforgiving, but its players are polite. So polite, in fact, they'll let a raw rookie like me crash a league game just to feel the spirit firsthand.

In big cities, curling clubs keep elaborate records of teams and matches, but in towns like Mapleton, curling is carved into family trees.

On Wednesday night, being one player short, skip Larry Barott puts me on his men's league team. With a half-hour of curling to my credit, there I stand, broom in hand, hoping I won't hurt anybody. Our two teams shake hands. "Good curling!" And suddenly I'm playing "lead," curling's equivalent of baseball's right fielder. Throwing the first two stones in each end, I can't do much damage. "Just keep 'em in play," my shaggy skip tells me. I nod, but that ice looks long, and my stone is heavy. I step in, crouch, slide and release. My throw feels as if it won't even reach the playing area, but it sails right off the sheet. "Ten feet less next time," Barott

Gravestones at a rural cemetery not far from Mapleton leave little doubt about the favorite pastime of the deceased. The area had a strong Scottish presence and at least two curlers.

calls out. And with beginner's luck, I land my second stone just inside the back line in potential scoring position. It gets taken out, of course, but it's one small victory for a curling klutz.

Despite my efforts, we take a 2-1 lead. I manage to throw another stone in the house, but I throw many more off the barn wall. Our opponents tie the score. We inch ahead. They tie it again. The game goes into extra ends where the icy match gets dicey. They put their first stone right on the button. I send two careering toward northern Iowa. Our opponents lay a guard in front, but we take it out. Bam! They lay up another guard, and we miss it again and again. They're just two stones from victory, and Team Barott is counting on its skip.

Larry Barott has been curling since he was 8. He learned the sport from his father. Now a corn and soybean farmer, he has also been a Peace Corps volunteer and an icemaker for the St. Paul curling club, the nation's largest with 700 members. An easy-going man with a perpetual grin, Barott is all business now. His first throw clicks against one of their guards, knocking it clear. The rival skip's last stone goes nowhere, and it has come down to the hammer in the bottom of the ninth. Barott crouches and stares down the sheet. He slowly lifts himself and pushes off. Giving the stone a quarter turn to the right, he releases it at the hog line. "Sweep," he calls. A teammate and I polish the ice. The stone rumbles and wobbles. A curling stone is the slowest projectile in sports, yet if the match is tied, it has all the drama of a putt protecting a single-stroke lead on the 18th green. He calls off the sweep. The stone curls around the guard and crosses into the house, knocking our opponent's winner cleanly out of play before it stops. Right on the tee. We win 6-5. We shake hands all around. "Good curling."

I decide to retire undefeated. I head with the others to the club's social room, where the winners buy the drinks. There we replay the game, asking its many "what ifs." What if this rock hadn't hit that one, which took out another? What if the ice hadn't been so keen in the final ends? We share legends and lore. Remember the time when Jeff Annis' team scored curling's ace, a perfect eight, all eight stones closer than their opponents'? And the time when Larry and the others all came to the district finals in the middle of that blizzard?

Yet again this year, the Heather Curling Club will resound with a youthful roar. Here, where curling is taken as seriously as winter itself, a hoary tradition continues. Each winter, the ice is taken over for a couple of weeks by Ceal Caldwell's fifth graders. "The kids have certain privileges in fifth grade," Caldwell told me. "They get to go on a ski trip. They go to an amusement park. And they get to try curling." Like the peasants in Bruegel's painting, the kids race up and down the ice, slipping, sliding, sweeping. They frolick in the rink as their ancestors did on the frozen Maple River. Equal parts eagerness and awkwardness, they slap high fives, shout out their successes, scream at stones gone astray. "Watching it's kind of boring," says a slender, dark-haired girl named Joy Hardie. "I thought it looked a little silly. But my grandfather curled and my aunt curls. It's really fun to play. I'm going to keep doing it."

Bruce Watson has broom (of the household variety) and will travel. A retrospective of Layne Kennedy's work will be shown this summer in Grand Marais, Minnesota.

GOOD NEWS

AT LAST, A REPAIR SHOP WHERE DRIVERS GET WORKING WHEELS

GARAGE

AND THE KEYS TO THEIR FUTURE

BY RICHARD AND JOYCE WOLKOMIR

PHOTOGRAPHS BY RICHARD SCHULTZ

Rear brake shoes. Replaced.

New timing belt.

Right-rear-wheel cylinder. Check.

Changed oil and filter, one new brake-light bulb, new spark plugs . . . Check.

Chief mechanic Jon Van Zandt checks off the work he has completed for the Toyota on his lift. It is a white Corolla DX, 1990, rust-pocked. But the compression reading for all four cylinders is good. Transmission, OK. Drive belts, OK.

"All ready for . . ." (checking his sheet) ". . . for Dee Bright Star."

He lowers the car and starts the engine. Smooth. He backs the Corolla outside the three-bay garage and parks it in a row of other aged cars, all donations. Some came from here in Vermont. Others were donated in Massachusetts or Connecticut, or

As the proud owner of a reconditioned Volvo wagon, Dee Bright Star now has wheels to get her to work.

points south, and then trucked all the way to Burlington.

Van Zandt, a large, red-bearded man, balding, leans against his scarlet Triumph motorcycle, parked beside his workbench. He wipes his hands on a rag. In a slow bass voice, he intones, "Wheels to keep Dee Bright Star working." It reminds him: "Yesterday, a guy came in who was living in his car—he drove it in and it died, so we gave him a Volvo for $80."

On the wall behind him is a letter from U.S. Senator James Jeffords: "What a fantastic way to aid the needy!" There is a 1998 Community Development Award from the City of Burlington, a proclamation from Vermont's governor, a U.S. Small Business Administration Special Award. And a special recognition citation, for nonprofit innovation, from the Peter F. Drucker Foundation. It has zoomed, this idea: fix up donated old cars, with the donors earning a tax write-off, then sell the cars—for just the cost of repairs—to people otherwise too poor to buy a car and who need one badly.

Activist Hal Colston (right) dreamed up the idea of repairing used cars for needy clients. He joined with Frederick K. Neu (below), pastor of the Ascension Lutheran congregation in South Burlington, Vermont, to create the Good News Garage.

Jon Van Zandt learned auto mechanics at his uncle's shop in New Jersey. He has been an engraver in New York City and a lobsterman in Key West. "But this is probably the best situation, working for the Good News Garage, because it's rewarding," he says, raising the lift to elevate his next patient, a 1989 Dodge Colt. "Here we only do work that *needs* to be done."

Back-up lights out. Air cleaner defunct. Right-rear tire blown. Tune-up . . .

Lifts clatter up and down. In their bays, the garage's three mechanics untwist bolts with staccato-sounding pneumatic impact guns. They test-start engines, making them roar. They clang screwdrivers and pliers into toolboxes. Ignoring the din, the garage's director, Hal Colston, tall and trim, with a neatly clipped mustache and beard, and wearing a blue shirt and a yellow bow tie, sits at a grimy table, frowning over applications from would-be car buyers. He is rapidly going through a stack with Kathy Shand, the garage's service writer, sorting them into three piles: "Pressing"; "Iffy"; "Call Them Back for More Information." Right now, more than 300 hopefuls are waiting for cars, with more applications pouring in.

"This one's going to lose her job," Shand says. "Where's she working?" asks Colston.

"Health club—she absolutely has to be at work at 6 A.M. or they say that they do not want her at all."

Colston drops that application onto the "Pressing" pile. "This one's, he's going to lose his housing," Shand says. "Boy!" Colston says. "OK, get him a car that's $600 to $800." "This one works two days a week, 12 miles from home, but at the end of summer that could be a full-time job, and she can spend $400." "All right, that one is OK," Colston says. "This is an elderly woman, and she prefers an automatic . . . " "This one's a single mother with a disabled child and an 82-year-old grandmother, and both the child and the grandmother have to get to the hospital . . . " "What about this guy?" Colston says, eyeing an application suspiciously. Shand shrugs: "Every time I see him, he's got a six-pack in his hand." Colston shakes his head. Shand points to the next application in the stack.

In some ways, this garage is rooted in York, Pennsylvania, where Hal Colston grew up during the 1950s. His father worked as a machinist and as York's first black milkman, among other jobs, putting in long hours to support his wife and six kids. It was from his father that Hal learned "to go after what is right."

A football scholarship took him to the University of Pennsylvania. He played quarterback and studied electrical engineering. But he met his future wife, and he decided against graduate school. Instead, in Philadelphia, he went into the restaurant business for 15 years. In 1989, Colston and his wife and their three kids moved to Vermont. His wife became an administrator at St. Michael's College. He joined the faculty of the New England Culinary Institute. But his enthusiasm for the food business was fading. He switched careers, becoming associate director of a social services agency.

Meanwhile, the Colstons had joined a Lutheran church, the congregation's only African-Americans. They felt welcomed. And Hal admired Martin Luther's willingness to take a stand. He became part of a multi-congregation quest for a worthy project.

Spurring the quest was a local pastor, Frederick K. Neu, who had previously worked for the New England chapter of Lutheran Social Services, a charitable agency operating programs that include adoption services, nursing homes and refugee services. His former employer had no project in Vermont. Rick Neu wanted to fix that.

Meanwhile, in his new work administering an Office of Economic Opportunity agency, Hal Colston was becoming the car-fix-it guru. In college he had bought a $500 motorcycle that almost instantly suffered a cracked head. A motorcycle shop decreed repairs would cost $450. When he returned with his large, imposing father, the price abruptly dropped. But Hal was piqued. He bought a manual and a few tools, and from then on conducted his repairs himself. He became a competent "shade-tree mechanic." Now, in his new job, Colston saw the importance of cars to his clients. "Most needy people," he came to believe, "are poor because they don't have jobs." Public transportation often is skimpy. And many jobless people, he discovered, cannot find work because they cannot afford a car to reach a job site. Colston called junkyards, hunted up friendly mechanics, did what he could.

One client came in tears. With her two kids, she had left a battering husband and, as a result, became a welfare recipient. She wanted to work. But she needed a car. She finally scraped together $500. As she drove her new pur-

Today, master mechanic Jon Van Zandt takes on the demanding task of restoring donated wrecks to working order.

Stained-glass artist Brian Cambra "couldn't get enough work locally." Now he drives to jobs across the region.

chase home from the used-car lot, however, its brakes failed. More breakdowns followed. Colston tried to get the dealer to return her money, even calling in the police at one point. But the woman lost her $500 and the car. She found herself in worse economic shape than before.

It was then that Hal thought of a "community garage." It would be like a community health center. Even if you had only a few hundred dollars, you could buy a car. It would be old, but it would be safe. And it would run. Rick Neu was enthusiastic about the suggestion.

Hal thought the idea of churches being involved with a repair garage was "a little wacky." But he explained the idea at a meeting. The congregations were so energized he knew the Good News Garage was going to happen. And it happened rapidly. Donations. A grant from a charitable organization. Lutheran Social Services took on the garage as its Vermont project.

On July 1, 1996, Colston became the new garage's full-time director. Then he met mechanic Jon Van Zandt, who was looking for space to start his own repair shop, and persuaded him to sign on with the embryonic Good News Garage. At first, they set up shop in loaned space, at the local municipal bus garage. Then they moved the enterprise into a former motorcycle repair shop in downtown Burlington, one block up from the slip where white ferries churn in and out, crossing Lake Champlain. The garage also began taking in welfare recipients as trainees on the premises, preparing them for jobs.

"Well, we do have a 1989 Honda, and it does have an automatic . . . "

Kathy Shand is on the telephone in her bailiwick behind the three lifts where the mechanics work. Except for her telephones and computers, it is

Linda Poppe had, "in better times, donated a car." Now she is a "most grateful recipient."

Richard Kemp, "semiretired but a full-time activist," could not afford a decent car.

A Good News car allowed welfare recipient Sandra Lewis to "obtain a job I wouldn't have been able to take."

not officelike back here. A table is strewn with oil-stained tomes, like *MOTOR Auto Repair Manual 1993: Chrysler Corporation and Ford Motor Company—Professional Service Trade Edition*. There are stacks of labeled plastic bins. "Exhaust Adapter Hangers . . . Etc." "Vacuum Fittings." "Castle Nuts." Against one wall is a computer test center, worth $30,000 new, donated by Vermont Technical College. It includes a scope analyzer, a smart engine analyzer and an EPA emissions analyzer. Stacked beside it are batteries salvaged from donated cars judged too decrepit for repair and towed off to junkyards.

"I answer phones, order parts, write letters to people who donate cars, run for lunch—I do everything," Shand tells a visitor. "Or people will call to donate a junker, and I'll see if I can match it with another junker, combining the parts to get one working car." Today she is especially enthusiastic about her job. This afternoon she will receive her first paycheck, after more than a decade on welfare.

She had been raising four children alone. Their father made just three months of child-support payments in 18½ years. At one point Shand tried to earn a nursing degree, but the finances ultimately proved unmanageable. She is still paying back the loan. Then she volunteered for Reach Up, a state program that provides welfare recipients with money for expenses, such as childcare and auto repairs, when they work as unpaid apprentices, learning job skills. She chose to apprentice at the Good News Garage. For one thing, after suffering chronic car troubles, she wanted to become mechanically proficient. But her real talents, Jon Van Zandt decided, lay in service writing, a job he was then handling himself. She proved adept. At her apprenticeship's conclusion, the garage offered her a full-time job.

She has already picked up a Good News Garage car. It is a mahogany 1988 Toyota Camry. The odometer is ticking toward 200,000 miles. But the price was right—$285, plus $140 for tax, registration

Single mother Debra Coleman needed transportation for her children: "This is my first reliable car."

fee, and towing charges to get it to the garage. She lives just a block from the garage, but with four kids the car is vital for such trips as doctor's appointments. And now, with a car and a job, she dreams of moving out of the city.

"We've had a 100-percent placement rate for our trainees—say hello to Kathy Shand," Pastor Rick Neu is telling U.S. Senator James Jeffords, who is visiting the garage this afternoon with three members of his staff. Neu adds a clincher: "Seventy-five percent of the people referred by the Department of Social Welfare, who buy our cars, wind up getting off welfare!"

"What about replication?" the senator asks.

"We've heard from 60 communities across the country who want to do what we're doing," Neu says, "and now we're expanding ourselves." The garage is adding an outreach center for needy people in Vermont's poorest quarter, the woodsy Northeast Kingdom.

"Our average car sells for $650, but it's worth $1,000 to $3,000, so the buyer can use its book value as collateral for a loan to buy the car," Hal Colston tells the senator. Social Welfare, he adds, cannot buy cars for its clients, but it can grant some of them up to $400 for car repairs. And since the Good News Garage charges only for repairs, many welfare recipients can acquire cars that way. To date, Colston adds, the garage has processed about 400 donated cars. Of those, it has provided some 200 to customers and junked the rest as unfixable.

Financing? Colston says the annual budget is about $380,000. It costs, on average, some $75 per vehicle just to tow or truck donated cars. Here, he points out, every donation counts. On a wall behind him, for instance, is tacked a letter from a man in Chelsea, Massachusetts: "I saw what you are doing to help people who need cars on my local news. God bless you!" The writer explains that he lives on Social Security disability payments, and has had "over the years, a lot of people who helped me get by in one way or another. I have extra money each month because of good budgeting. I'd like to send you a little each month to help you help someone in Vermont."

Besides such donations, Colston explains, there are small grants, such as $10,000 annually from the U.S. Department of Housing and Urban Development. The garage's goal is to turn out 43 cars a month. "We're a long way from that," says Rick Neu. But the garage has hit upon a new income producer: when donors turn over old luxury cars, like Mercedes Benzes or BMWs, which would be too expensive for the garage's low-income customers to maintain, the garage refurbishes them for sale at market value. So far, Colston says, about 15 of the rehabilitated fancy cars have sold. He believes this promising sideline will evolve into an important funding source. Meanwhile, however,

maintaining a steady stream of donated cars of all types is a constant worry.

"What we could use now," interjects Pastor Neu, "are tax breaks for rental-car fleets, to induce them to donate the cars they now drive into the ground and auction off."

"I am on the Senate Finance Committee . . . " Senator Jeffords mentions.

"Well, we know that," Neu tells him. "We're Lutherans, but we're not dumb!"

Later, at the garage's tiny new headquarters, a block away in a lakeside office building, Colston and two volunteers are conducting serial telephone calls. Volunteer Marian Kuschel peers at a computer displaying a database devised by her husband, Bill, a retired IBM computer engi-

Outside their garage in downtown Burlington, the staff gathers with a number of Good News-car drivers and passengers.

neer who donated his work. The database will enable the garage's staff and volunteers to keep better track of their rolling stock. Until recently, Kuschel was marketing director for the local performing arts center. Now she donates her marketing skills to Good News.

At the computer beside her, volunteer Ed Stowe is shoulder-clenching a telephone receiver to his ear. He used to be an IBM engineering manager. Now, for the Good News Garage, he is creating a car-donation infrastructure.

"Yeah, you could take a train back . . . " he is saying into the telephone. It was, he later explains, a caller from Pittsburgh, wishing to donate a car and willing to drive it all the way to Burlington himself. Most donors ask the garage to send a truck to transport their car, which is costly. Stowe is setting up depots in various states, at Lutheran Social Services sites, where donors can park cars and the garage can send larger trucks to collect several at a time. He is developing a network of volunteer drivers, too. But that means the donated cars must be drivable. Currently, many are not. Meanwhile, calls keep coming in.

"You say your car's name is Timmy?" Stowe says into the telephone. "Do you know how many miles Timmy has gone?" He scribbles down "120,000." "An '86 Chevy? From Chatham, New York? Timmy is in a garage right now?" Yesterday, he says, sotto voce to a visitor, somebody donated a car named Beluga. He scribbles more notes on the donor application. "I see," he says. "You want to share Timmy."

Donors of cars can receive a tax write-off. But many people, Stowe has found, make the effort simply to help others. And many, like Timmy's owner, are too attached to their aged cars to relegate them to junkyards.

"The red car's story, as far as I know it, began in Honest Charlie's used car lot in El Centro, California. . . . " So begins the illustrated, seven-page "The Red Car's Story," which the donors of a 1978 Chevrolet Monza left with their car, for the new owner, a single mother with small children. The donor's work, constructing power plants, required frequent moves. By the time the family came, briefly, to Vermont, the Monza had been charred in a torched condo garage in El Centro, California. It had experienced -60-degree temperatures along the St. Lawrence River, although "she started every day." It had been interred, briefly, along with its owner, when a power plant plow driver inadvertently buried it in snow.

Facing a move to Texas, the family decided the Monza was too old to go along. Driving the car to a church parking lot to make the donation, says the author, "I patted its survived-the-fire roof paint and said goodbye with tears in my eyes." They left a last word for the new owner: "We hope she will see your life improve. We were barely making it when we got her; we are blessed with a reasonable amount of financial security now." They conclude, "Be good to her, she's a good little car."

Dee Bright Star arrives at Good News late, just before closing, in a taxi. "My car died; there's been no way to get around," she says. Meanwhile, her work—assisting disabled people in their homes—has been slipping away because she cannot drive. "I've already lost clients because I could not get there," she says, as she fills out the paperwork.

With her long, dark hair, and sandals, and silver

Good News staffer Kathy Shand attaches a license plate for Maria Videll, who would have lost her job without a car.

bracelets, rings and necklaces she made herself, she seems to have appeared in this oily garage from a more glamorous dimension. "I grew up here in Vermont and married a man in the Air Force," she says. "We lived in Spain and Turkey." The marriage ended. Back in Vermont, she worked as a veterinary nurse until a shoulder injury made it impossible for her to lift animals. Meanwhile, she discovered she was part Native American, an Abenaki. She began volunteering to comfort dying Abenakis. That led to a new line of work, assisting disabled people in their homes.

When her car died, she bought a used car for $500. "But one month later it died and I was stranded on the Interstate," she says. "I had four clients; that dropped to two, because I couldn't get to their houses, but I heard about this garage . . . " A regular used car, she explains, would have been too expensive. She fills in the sales documents, then looks up. "I guess I was waiting for a miracle."

She lives in a town many miles from here, however, and time is running out to register the car she is buying. If she does not get to the Motor Vehicles Department quickly, it will close and she will have no way to get home. Luckily, two visitors to the garage offer to drive her across town. The garage agrees to let her register the car before she has paid for it. After a quick drive, at the Motor Vehicles office she pays $160.10 to cover registration and the 6-percent tax on the car's book value. Driving back she sighs, "I'm finding it harder and harder, living on the edge."

Back at the garage, she discovers a mistake. Because of her shoulder injury, she had specified that she must have an automatic transmission. But the Toyota Corolla set aside for her has a standard. She cannot use the car she has registered. She begins to sink into despair. "Let me call Hal," Shand says. A few minutes later, Colston hurries into the garage. He is driving to New York City this evening and is already two hours late getting started.

Colston spots an unassigned yellow 1986 Volvo station wagon in the row of reconstituted cars. It is bigger than Bright Star wanted, but its transmission is automatic. She has already registered the Toyota, however. "We can do a transfer. As long as you mail it today, you can drive the Volvo today," Colston tells her as he works rapidly with a calculator. The Volvo will cost more than the Toyota; the tax will be higher. "We'll eat the transfer fee," Colston says, punching keys. The new total comes to $60 more than Bright Star has. "Well, we inconvenienced you, so pay us the rest next week," Colston says, handing her a check for the money she paid to register the Toyota. "When you get your title to the Volvo, donate the Toyota back to us," he says. "Would you like me to mail this for you?"

Outside, he bolts plates onto the Volvo as she watches, a bit dazed. "My dogs will like this car," she says. "And if I don't get back to work, the next thing is that I'll be evicted." "Happy motoring," Colston says, heading off at a trot for his own car and the drive to New York City.

It is a day later. A new purchaser, a middle-aged woman with blonde hair, glasses and a white baseball cap, is sitting at the garage's table, filling out forms. "I used to be a nurse in a nursing home," says Sharyon Sevene as she writes. "In 1975 we were lifting a patient and the other nurse fainted, so I took all the weight and it severed my sciatic nerve. I've been disabled ever since." A severe ice storm struck Burlington a few months before, and her car was destroyed in an accident. She can barely walk to a neighborhood convenience store, but she has found prices there too high. For her, Sevene says, a car is a necessity.

She begins adding figures. The car will be $500. But it needs tires, at $218. Insurance for six months, $214; registration and transfer tax, $68; inspection, $15. "This car will cost about $1,000. If I bought the same car at a used-car dealer, it would cost $1,000 just for the car, about $1,500 total. On a fixed income that is not possible," she says.

Outside, she watches Jon Van Zandt bolt the license plates onto her new car, a 1981 Ford Granada, lime green with rusted patches along the door bottoms. "I can't use a small car because of my size—they match the car to the person," Sevene says. "Hal is dedicated to getting people back to work," she adds. "I can't work, but I can bring people in, and if I can leave a mark on life by telling people about the Good News Garage, I will!"

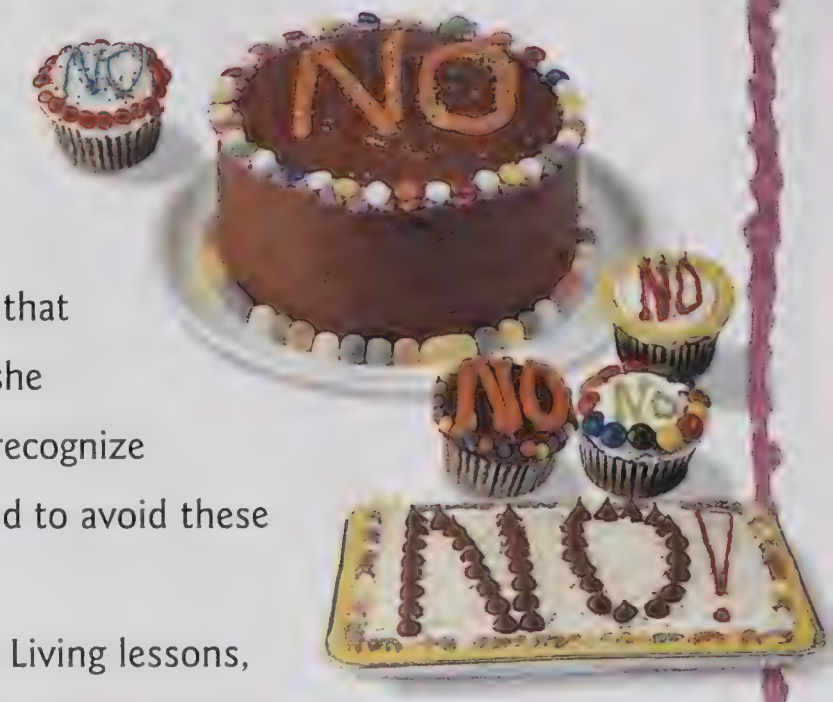
A few minutes later she climbs in behind the wheel and turns the key. The engine roars, and runs smoothly. For a moment, Sevene sits in the car, listening to the engine, smiling beatifically. "Do you know what this feels like?" she asks Jon Van Zandt.

He grins.

"Like spreading your wings," she says.

Richard and Joyce Wolkomir hope they may have picked up some car repair skills as they reported this story. Richard Schultz is based in Boston, Massachusetts.

Why Ms. Felber teaches her class to be so negative.



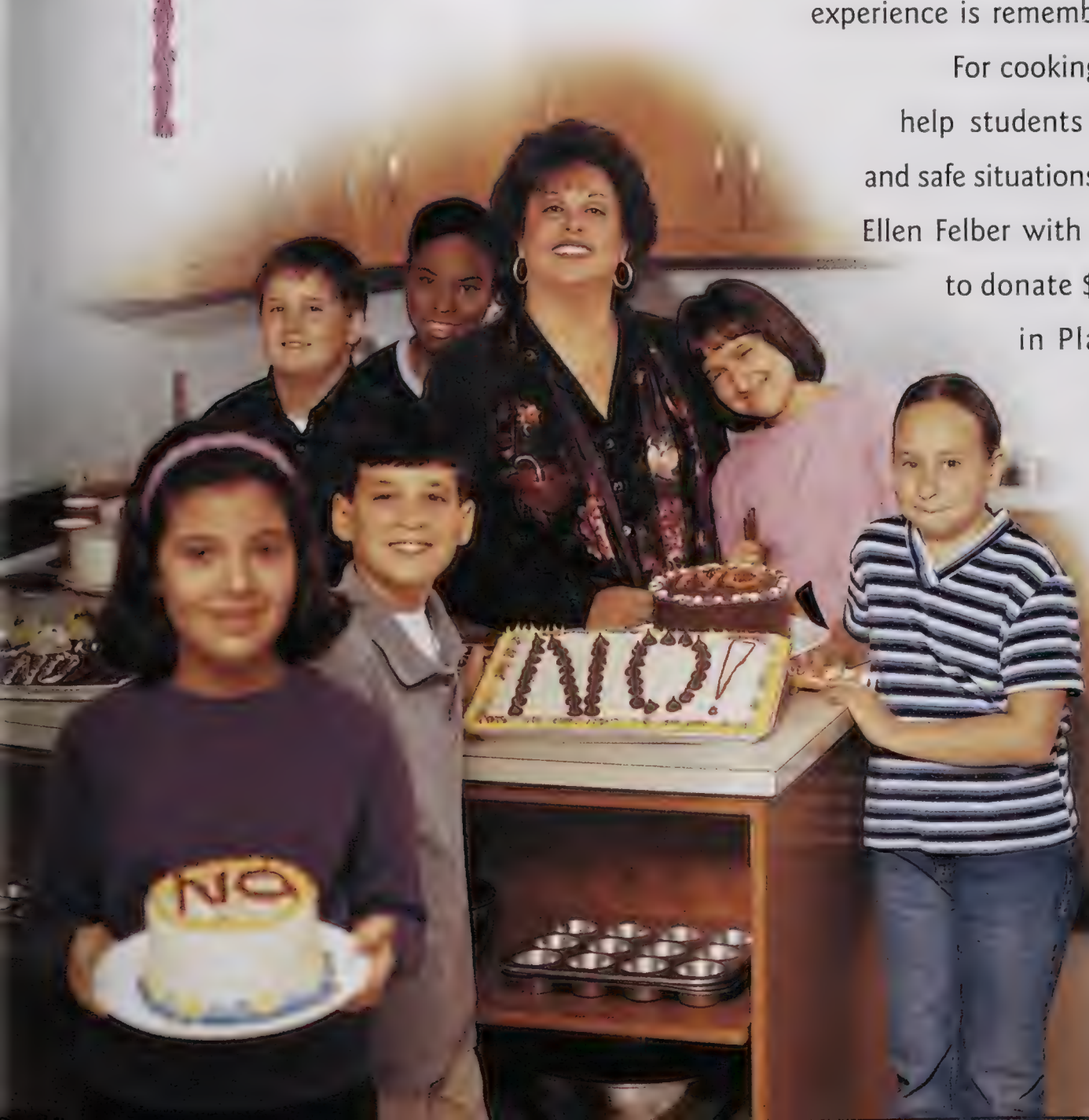
As a Special Education teacher, Ms. Ellen Felber knows that Exceptional Children are no exception to sexual abuse. So she devised an ingenious lesson to teach her students how to recognize the dangers in a way that wouldn't overly frighten them and to avoid these dangers by learning when to "say no".

Using skills learned earlier in their Activities for Daily Living lessons, each student bakes a cupcake. They then apply icing and a variety of decorations displaying the message of the lesson: "SAYING NO!"

Next, a cake is baked by the class consisting of sections. Each section designates a specific grouping of family and friends, along with the appropriate behaviors which should be allowed.

By incorporating many skills and senses into this lesson, Ms. Felber finds that her Exceptional Students can associate and remember the sections and their meaning. The total experience is remembered and, with it, the lesson.

For cooking up such a memorable way to help students distinguish between dangerous and safe situations, State Farm is proud to present Ellen Felber with our Good Neighbor Award, and to donate $5,000 to Mattlin Middle School in Plainview, New York. Thanks to Ms. Felber, her students find "saying no" a piece of cake.



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To Save a Falcon

AN AMERICAN BIOLOGIST TREKS THE STEPPES AND THE GOBI TO RESCUE A MONGOLIAN RAPTOR THAT'S IN DEEP TROUBLE

BY ADELE CONOVER

AS THE HAWK SAW IT, I WAS THE NIGHTMARE, A PREDATOR WHO HAD climbed the 20-foot pinnacle of rock to raid her nest and feast on her young. As I saw it, I was the target of the angry raptor coming at me like a bullet. In shock, I scrambled down the rock, panting with terror, with the aid of bird behaviorist David Ellis. I touched my face. I was amazed to see my hands covered with blood—my blood. The bird had hit my face with all her talons, inflicting eight puncture wounds. I was lucky. I still had two eyes, and artist Jim Lish applied cleansing alcohol, bandages, antibiotics—and a shot of vodka. We were back in business: a mission to aid the beleaguered saker falcon.

Ellis and I were in the hawk's aerie legitimately. We were reconnoitering raptor nests in Mongolia in search of the saker, a most elusive bird of prey that Ellis has studied there for four summers. Because sakers don't build their own nests, the prospect of finding a saker aerie where another raptor or even a raven might have built one was high. We had already visited some 100 aeries by the time I was attacked. We were midway through our 3,700-mile odyssey on the steppes, deserts and mountains of this remote Alaska-size country.

In his work in Mongolia, Ellis, a senior raptor biologist with the U.S. government, had learned enough to know that the saker, favorite of falconers in the Middle East, needs help. Estimates of its population in Mongolia range from 1,000 to 20,000. Although the cash-strapped Mongolian government allows a legal trade in sakers, greed has dictated that the numbers taken may far exceed a sustainable yield. The Mongolian authorities charge $2,700 per permit, most of which go to dealers. Yet, there are never enough birds, and avid falconers in the Middle East reportedly will pay anywhere from $10,000 to $200,000 for a perfect female saker, legal or not.

Biologist David Ellis examines 6-week-old hawks in Mongolia. Like other raptors, saker falcons, such as the female at right, often coopt old nests of other birds.

PHOTOGRAPHS BY DAVID ELLIS

At the Novosibirsk airport in Russia last year, police seized a group of Syrians who were attempting to export 47 saker falcons hidden in boxes to the United Arab Emirates. Back at Ulan Bator, I was told that smugglers have concealed birds under their coats after dosing them with liquor to keep them quiet.

To help sustain the falcons, Ellis built 66 aeries for house-hunting sakers last year. Keeping secret the locations of these, as well as of the 125 others he had found, is vital. Lish and I and Mongolian ornithologist Batdelger (many Mongolians go by just one name) made up Ellis' team this year for the first month of the canvass. (Lish is an artist and photographer collaborating with Ellis on a book about golden eagles.) Our meandering route in Ellis' cranky Russian jeep was determined by his Global Positioning System receiver, his list of known or built aeries, and his own intuition.

Flying at speeds up to 150 miles per hour, sakers are slower than peregrine falcons. Yet sakers are better tacticians: masters of the fake maneuver, the deceptive feint, the fast cut. It is no wonder that the saker falcon is the hunting bird of choice for the ruling sheiks of the Gulf States in their traditional pursuit of the houbara, or Macqueen's bustard, a hen-size desert bird considered a delicacy.

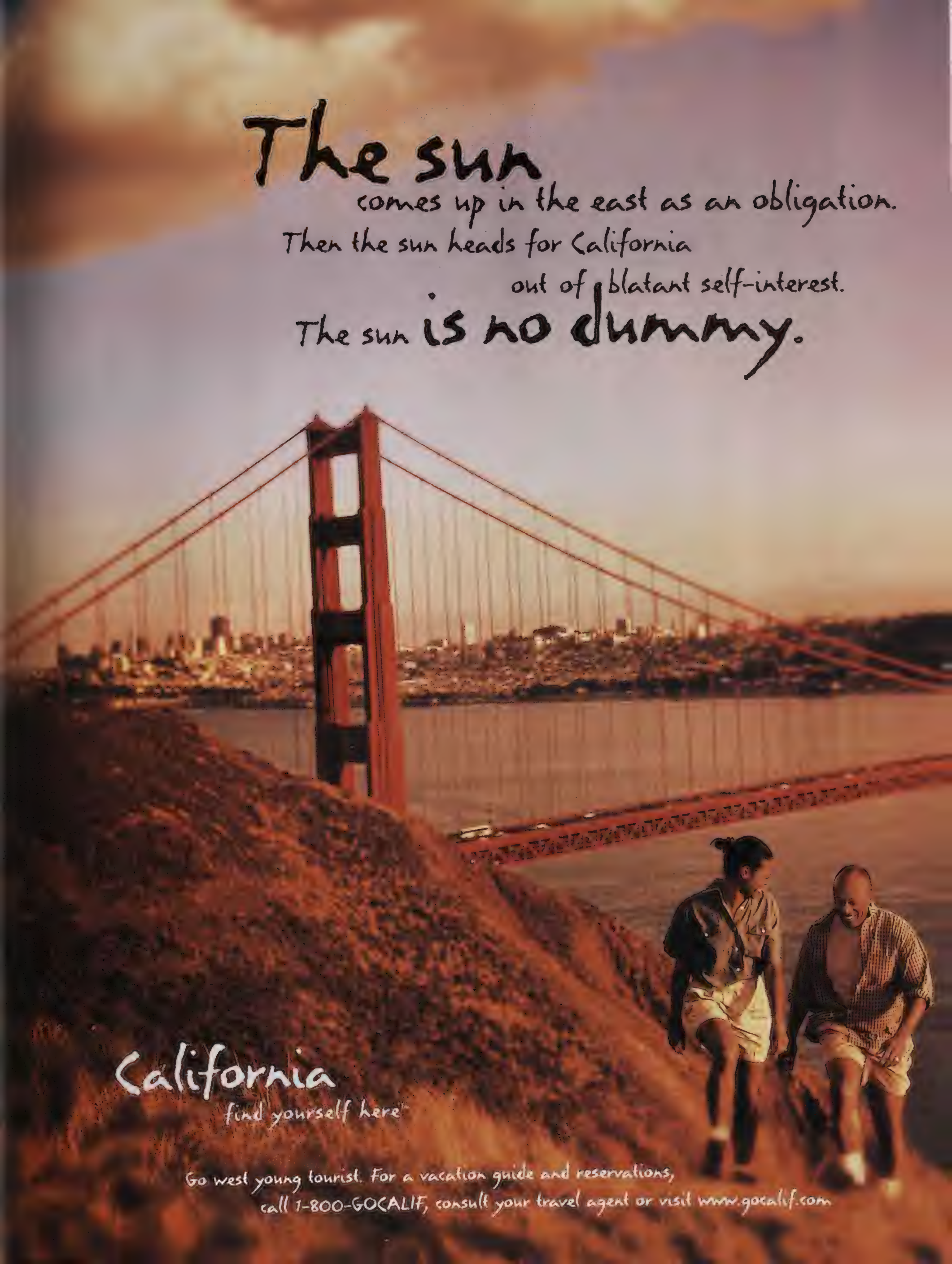
The saker's warrior gestalt is part of myth and history. The uncommon dark-chocolate Altai race of saker, according to legend, fathered the Huns; its image was borne on the shields of Attila's armies. Seven centuries later, the Altai saker was revered by Genghis Khan and his sons who, hunting with this falcon in winter, demanded that a caravan of 50 camels loaded with swans, a favorite prey, be delivered weekly.

We began our survey by heading north from Ulan Bator, crossing the Tuul River into the shoulders of the Khangai Mountains. Even in the cold Mongolian May, the nap of the eroding mauve hills, when presided over by an immense black vulture, had a certain melancholy beauty. The terrain we traveled is so vast it seemed like we were seeing the limitless landscape of time.

The first glimpse I had of a saker falcon was the angular jut of a flight feather, the straight line sticking out of the tangle of a wire-and-stick aerie, more than 90 feet up on a power-line tower. Delicate café-au-lait eggshell on the ground revealed at least one hatching. Undaunted by a 45-mph wind, Ellis, clad in his usual climbing gear—light shirt, ballooning khaki pants and rubbery sandals—scaled the tower to check the nest, and reported finding a scrappy white ball of a hatchling and another egg.

Two hours away at the next stop, the Ellis-built aerie held another female saker, incubating. A male fluttered up and the two began chasing each other briefly. Soon the two sakers were dancing in the streaming sky as the male passed his

Mongolian ornithologist Batdelger (top) holds a mirror to a nest on a utility pole so artist Jim Lish can see in. The poles are prime nesting sites for raptors, such as this female saker (left) who has taken over an old hawk's nest.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Above: A saker arrives at her aerie with a vole for her nestlings. The aerie is atop a large, unshaded boulder only ten feet high. The sticks are remnants of an old hawk or eagle nest. Left: The larger of these saker chicks is about 2 weeks old. Because saker eggs are laid at different times, the larger chicks sometimes eat the younger ones.

catch, a vole, to the female in midair. As we watched, Mongolian larks called, flashing through the scrub. Nearby, two gray demoiselle cranes with black ruffs strolled about. Only one thing marred this idyllic scene: a set of tire tracks. Someone else had been here recently.

As we hit each aerie—Rhubarb Tower, Leg Dangle, Dead Horse, Killer Bipod, First Pillar—the tire tracks persisted. In spite of them, Ellis counted two, then another three, then five more baby sakers, white puffballs lying prostrate, beaks open, "thinking" they were hidden if they did not move. The evidence for the hunting prowess of the parents of quintuplets lay under the nest: the legs of two small hawks, striped hoopoe feathers, a pigeon foot and the red leg of a chough, a crowlike Old World bird.

Although utility poles have served nesting birds of prey everywhere, they have their downside. At the site Ellis calls Killer Power Pole, four adult hawks lie on the ground, electrocuted. But raptors, like insured householders in a floodplain, continue to nest here. And sometimes they are successful. Last year a saker raised a family here. This time, however, the Killer Power Pole aerie is unoccupied. Here, too, there are tire tracks.

Bouncing over serpentine rocks painted yellow and red by lichens, we rush up a pea-green hill to another aerie, set on an old geological tripod (a benchmark used for surveying) abandoned by the Russians decades ago. Yet again, the tire tracks are there.

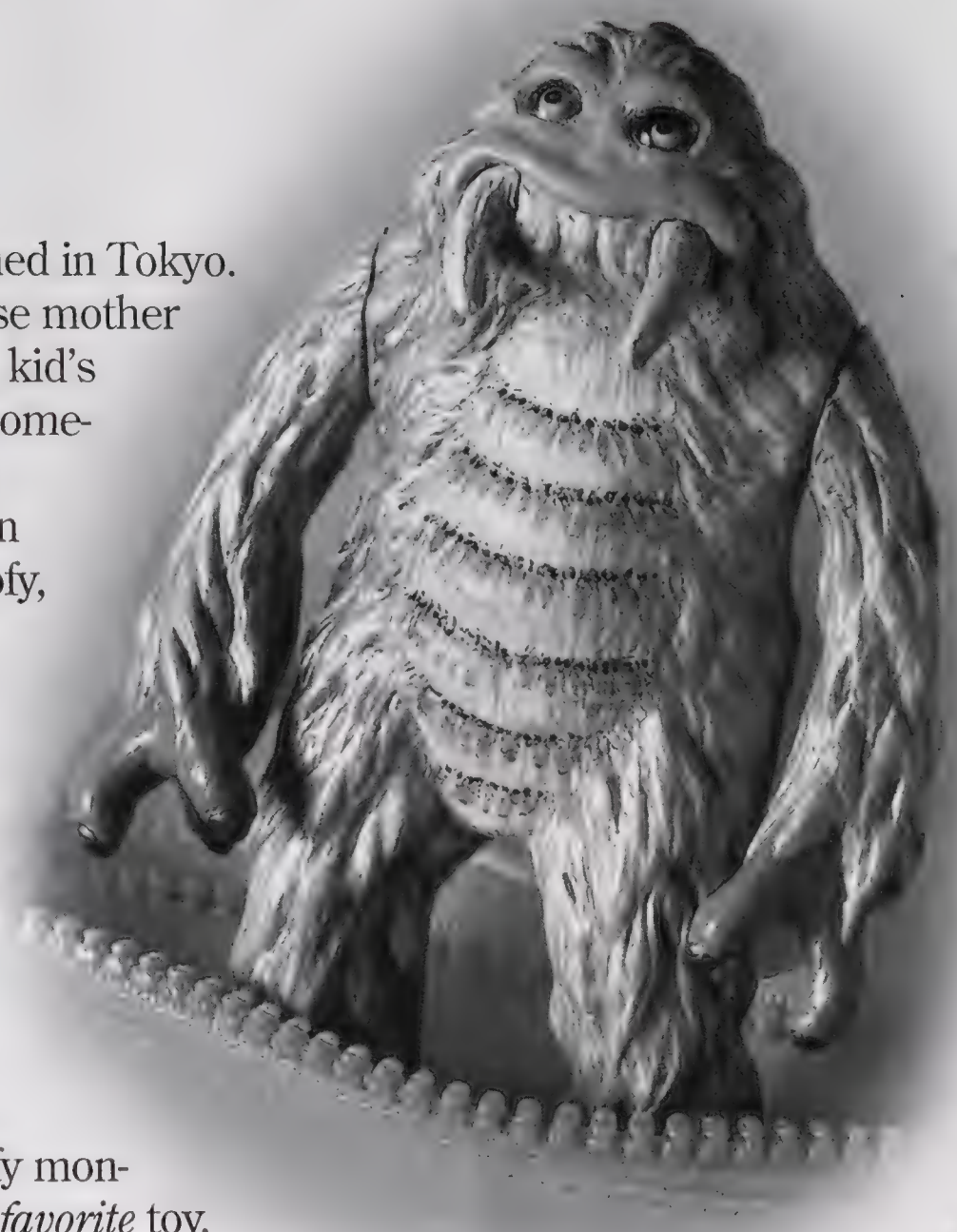
Although Central Asians were certainly among those who first used falcons to hunt for prey, it is unlikely that the tracks belong to a Mongolian falconer out looking for a hunting bird for himself. Ancient Mongols flew birds of prey for food and eventually sport, as did nomads elsewhere. Ellis says the practice likely died out with the advent of firearms. But the tracks might have belonged to someone who wanted a bird to sell abroad.

The high regard in which modern Mongols still hold birds of prey is reflected in ceremonial dances and warm-up routines performed by wrestlers at Naadam, the national celebration of the three "manly" sports: wrestling, horse racing and archery. Wrestlers warming up use flapping movements that imitate hawks and falcons. Those who remain in the final 16 (out of 500-odd matches) are dubbed Nachin, or "falcon," which is also a popular child's name.

Only in the northwestern part of the country where ethnic Kazakhs reside are eagles and falcons still trained and flown for hunting by the local people. Ellis has a Kazakh friend, Shetigan, whose golden eagle is indeed a fierce bird and has been trained the usual way to catch foxes: conditioning by regulated starvation. Shetigan makes extra money by selling the furs. Golden eagles are among the largest of the eagles regularly used in falconry, and when they are out of sorts they are just as dangerous to their owners and bystanders as they are to their prey. Ellis points out that Shetigan's aunt lost an eye to a golden eagle. "I would not let my 5-year-old child anywhere near that eagle," says Ellis (who owns a 38-year-old golden himself, back home).

As Ellis, Lish, Batdelger and I continue our odyssey, we head for the Red Steppe, a place of imposing cliffs and

The day we found a monster in our mailroom



This happened in Tokyo. A Japanese mother returned a kid's parka to us. And somebody in Shipping discovered a toy in the pocket – a goofy, 4-inch monster.

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Condor-size cinereous vultures soar over the steppe. The picture was taken from their nest, where they attacked the photographer.

great granite formations hulking like large prehistoric animals. As we explore, Ellis comments that there were ten saker pairs here in 1995, yet now there are only two pairs and only one with fledged young.

"Maybe there are no *cuis*," says Ellis, using a South American term for rodents and other small mammals, the staple of raptor life. The steppes of Asia are one of the few places in the world where you will see in the wild the "cuis" of North American kindergartens: hamsters and gerbils.

We couldn't ignore the dust storm in the distance, which was moving to erase from view still another set of immense rock islands that held known saker aeries. It's true that we had seen few rodents scuttling over the barren land, but most of the time our eyes were trained upward for a soaring raptor or at the rock walls for signature guano whitewash, a defining characteristic of what has been nesting or roosting where. On the basis of the stroke of a line of whitewash, Ellis can identify the current occupants of an aerie. And by laying feather upon feather he can tell their age and sex.

Before the dust storm hits, we visit the next three saker aeries. Ellis climbs as though he were walking along a street: effortlessly. Lish is no slouch, either, even lugging his enormous lens. Batdelger, I figure, grew up on a cliff. I, however, am grateful for the slightest slant, the placating ledge. I lean close to boulders as if we were dancing cheek to cheek. I scratch and scramble, often on hands and knees. Never has each bulge and cleft in the rock been of such enormous importance. I avoid looking down. Sometimes when we reach a summit, we are rewarded only by a bar-headed goose, a hawk or a steppe eagle. With few good building sites, it's easy to see why the birds of Mongolia play musical nests.

To escape the wind, we camp in a canyon under a frill of stunted birch trees. It is snowing. A man on horseback rides up, dressed in the traditional tunic and high boots. Apart from birds of prey waltzing in the wind and a distant group of horses gossiping under a tree, we thought we were alone. The horseman doesn't seem at all surprised to see us. After he leaves, we spend a cold night in our tent and awaken the next morning to find Mongolian hospitality in action: the horseman has left us a plastic bottle of fermented mare's milk.

We head across the valley for an aerie 40 feet straight up a cliff. As we approach, we hear the babies giving their special begging call. Ellis climbs as far as possible, then

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hoists an old truck rearview mirror attached to a long forked pole and "mirrors" the nest to find two white puffballs, baby sakers 15 days old. Sakers stay in the nest or crawl around on nearby rocks until they fledge at about 45 days. They hang around for another 20 or 30 days, however, cadging off their parents like twenty-something ex-graduate students. Siblings may stay together longer, depending on the food supply, but as the eggs are laid somewhat asynchronously, older saker babies will sometimes snack on a baby brother or sister. In the fall they'll migrate to warmer climes near the Arabian Gulf or to Africa or China.

At the south end of an immense stone island, an enormous high-top shoe kicked off by giants, a young male saker is catching a rodent. The falcon takes off from a perch, and a quarter-mile away it drops down to grab a vole. The force of the impact hurls the vole into the air. The saker circles back to pick up the hapless rodent.

By early June we leave the Red Steppe and head south to the Gobi Desert on a dusty, pocked trail paralleling railroad tracks. On this line there are a series of aeries set on what Ellis calls "railroad outhouses"—small adobe concrete check stations set at intervals of several kilometers. They are in shambles. The same is true of the Russian Army towns we see from time to time. Even before the breakup of the Soviet Union in 1991, the Russians had simply walked away. The Mongolians, rather than repopulating the towns, destroyed them. Batdelger's bitterness is palpable as he tells me that the departing Russians also left behind a trail of dead livestock.

We scrabble up the crumbling buildings at site after site. The tally is disappointing: a cold unattended hawk egg, an empty raven's nest, an abandoned saker aerie. In one railroad outhouse a full-grown horse lies dead. But finally, after the umpteenth clamber up the friable outhouses, success: a saker aerie at last. Ellis is not completely happy, however. He grumbles that the saker did not homestead on "his" nest, but chose a hawk's well-built cup. "I *guess* they know what they're doing," he concedes. Ellis judges the oldest baby saker—a tense white ball—to be 13 days old. Once again there are the tire tracks.

Abandoned Soviet military equipment and vehicles also serve as nesting sites. In fact, we are looking for a site called Two Dead Trucks on Ellis' list. But there are no landmarks, only a haze of swirling dust and empty trenches. After several hours of bumping around like popcorn in a cooker, we have to give up on Two Dead Trucks to head for the hills and make camp. We sleep not only like the dead but with them, our campsite set among graves. Before we go to sleep, we answer what we think are wolf calls. Lish says he heard someone whistling in the night. We must present quite a spectacle. The jeep is festooned with spoils from the steppe: a calfskin on the front grill (to keep out dust, says Ellis), two sets of blacktailed gazelle horns mounted on the jeep's hood, long flight feathers (vulture, eagle, lammergeier) poking from every holdfast, and, attached to the rear bumper, an ever-growing swatch of raven's feet, which Batdelger has gathered for study from expired birds along the way.

Batdelger is one of Mongolia's eight ornithologists but at the moment is "between jobs," having been fired from both the Mongolian Academy of Sciences and the Museum of Natural History. It is said he defied the party line: to encourage the export of saker falcons.

In the jeep we periodically drift into our own reverie, some of us singing old James Taylor tunes, others Buddy Holly or Johnny Cash. Nothing matches the melancholy melodies of Batdelger. To our ears the traditional Mongolian songs sound similar to North American Indian chanting.

We enter the Gobi Desert. Its texture is the color and grain of sackcloth. For the first time there are no distant

These were the falconers, and their charges, of Sheik Zayed (now the president of the United Arab Emirates) about 1949.

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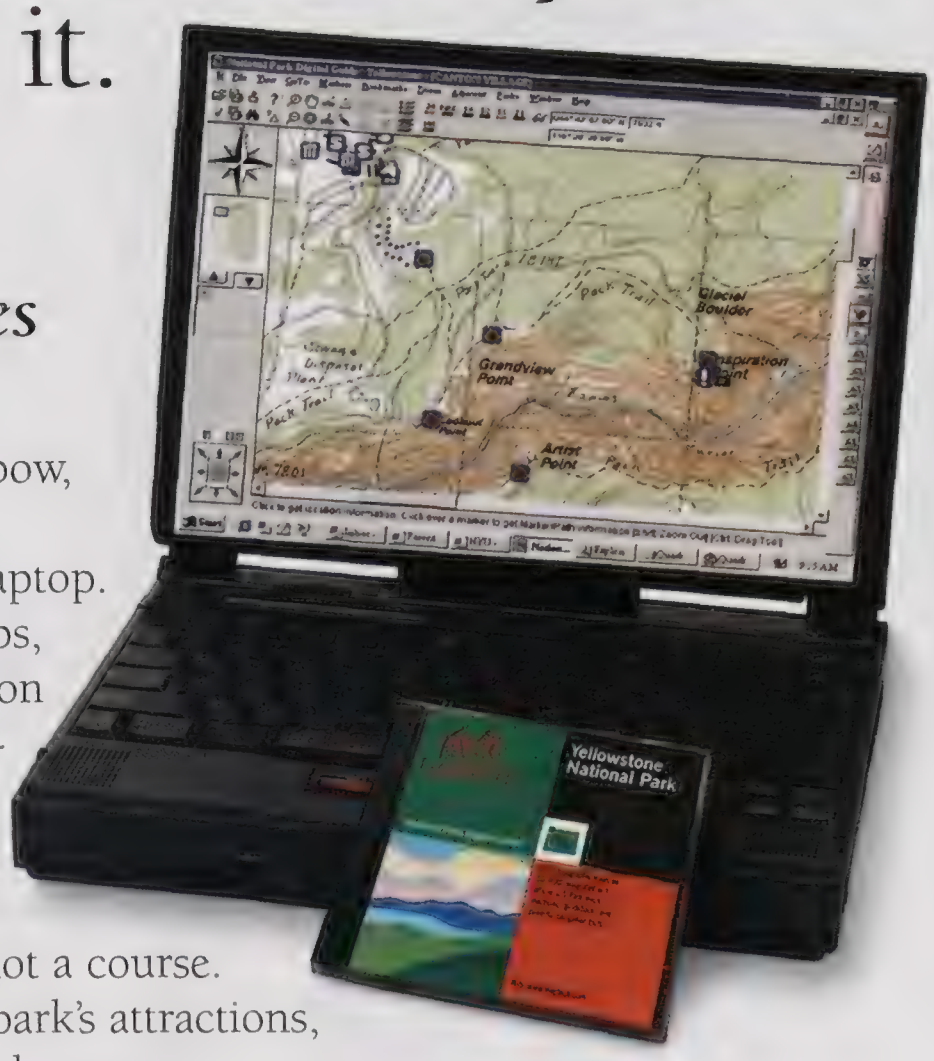

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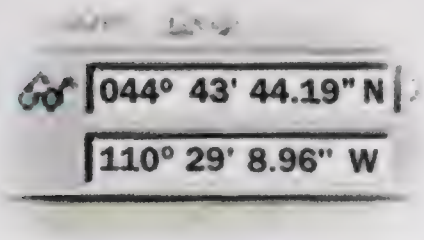

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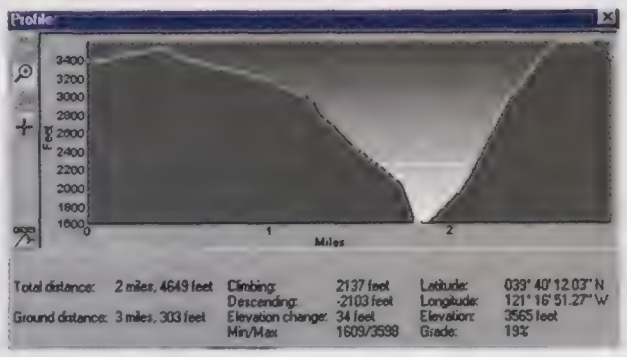

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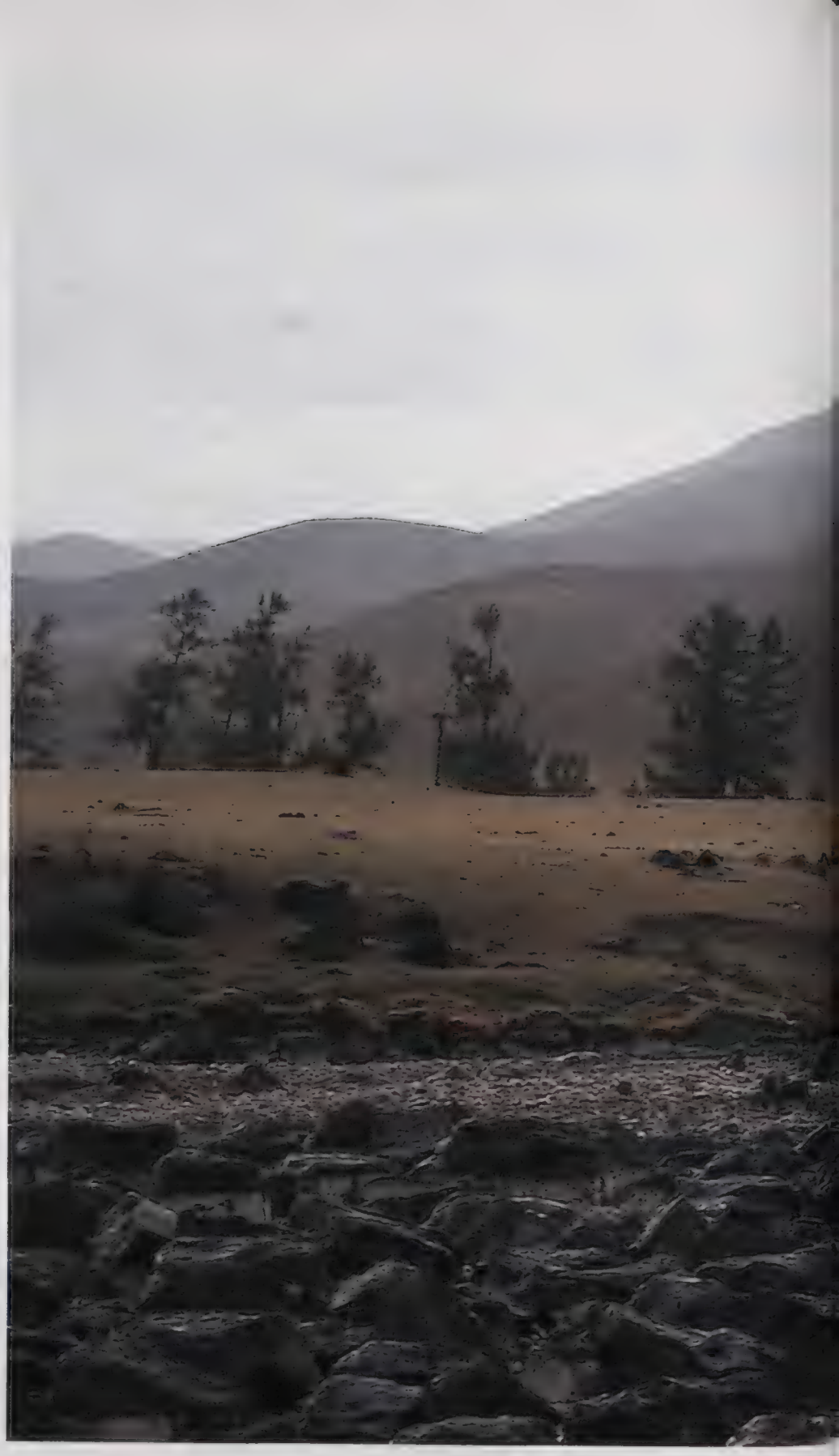
mountains, no shimmering lake reflecting the blue sky, not even a mirage: the view is a 360-degree horizon. But the plain is hardly featureless. A bush gathers sand, and a hawk has built a nest on it. Two young male hawks, fluffy and a soft gray, are stretched out on their stomachs imagining they can't be seen. As always, Ellis examines their longish legs for feather "boots." Such features will help him confirm his belief that this hawk species, confusingly known as the upland buzzard, is a mixture of two or three different hawk species.

The wind is terrible. We camp near a clump of scrubby elms among towering dunes. The site marks still another saker aerie on Ellis' map, yet there is no saker in residence and even the hardy ravens have left behind only one incredibly black feather. Through the night the wind is so strong (we estimate 60 to 70 miles per hour), we don't sleep much.

At dawn the Mongolian heavens are dramatic, a freight train of high-piled gray thunderclouds speeding by in the eastern sky. Attempting to reach the shelter of the jeep, I wonder if I can make it against the wind.

When the team asked Ganbayar (below) about eagles, he rode away to return with feathers from a dead eagle he had found.



Despite its virtues as an anchor, the jeep has had its troubles—if it has not been brakes or clutch, it has been the tires. So far we have had three flats. It is a survivor, however; before we leave Mongolia, the jeep will drop its driveshaft and ship water in one gas tank when we cross a suddenly storm-swollen river. But now we need *benzine* (gasoline, in Mongolian) and water, so we start for Saynshand to get water and perhaps a tire patch.

On the outskirts of town we meet seven jovial Mongols enjoying vodka. We ask this exuberant group if they know where we can repair a tire. The men have a rubber patch that they soak in gasoline until it is gummy. Then they hammer it onto the inner tube.

Tire rejuvenated, we venture back to the eastern Gobi. "To find saker falcons, you can't just look at the habitat

PP. 112, 113 ADELE CONOVER

Behind a rocky stream, horses wait patiently outside a yurt, the traditional Mongolian home. This area is relatively lush compared with some other parts of the country. The team navigated with a Global Positioning System receiver to census known nesting places.

and think in human terms, 'If I were a saker, where would I live?' You have to think like a bird," asserts Ellis as we set out on this unpromising terrain. Ellis aims the jeep at the only object above the horizon, a distant concrete structure decapitated by wind. Soon he is peering inside a toolshed-size concrete box and talking to four baby sakers who are screaming their heads off: "Hi, you guys; hi, little guys; I'll bet your parents remember me. . . ." We have come to what Ellis calls the Unbelievable Cistern, a well house unused since the Russians left with their subsidies.

Near the wrecked well, Lish finds a wolf skeleton. It is missing only one bone, a small round one in its ankle, called the talus. (Lish also has taught anatomy at Oklahoma State.) Traditionally, male Mongols seek this anklebone as a totem.

We begin to move north again into a transition zone—fields of buttery yellow flowers and tiny white blossoms rising from the sandy plain. We head into a little valley where sakers nested in earlier years. In four-wheel drive, we crawl over the chocolaty rock terrain to settle in a place we call Sandgrouse Camp after the fast bird, a buffy streak we saw nearby. In the morning on adjacent cliffs we find a new saker aerie with aggressive parents and four 35-day-old offspring. There are also cat tracks, likely those of *Felis manul*, the Pallas's cat, a yellowish wildcat, about the size of a big tabby.

As we are rummaging for sakers among some heavy granite outcrops, a beautiful 13-year-old boy rides up. His name is Ganbayar, and if any young man ever had the attributes that traditional Mongolian people regard as

promising—"fire in his eyes and a light on his face" as legend describes the young Genghis—it is he. Ganbayar spends the day with us, cantering on his horse from aerie to aerie.

He tells us he found a dead eagle a few days earlier but was afraid to touch it because a snake was lying on it. There are only nine snake species in Mongolia but a few are poisonous. According to legend, it helps to have a saker falcon around for this reason: a khan was once filling his cup with water from a stream when his saker kept knocking the cup out of his hand. After the third time the khan lost his temper and grabbed the falcon and wrung its neck. After he had a drink, the khan glanced upstream and saw that a large poisonous snake was emptying its venom into the stream.

We slip and bound in the jeep over deeply eroded washes as if we were mounted on horses to visit Ellis' Monster Eagle site. A huge female eagle with a wingspread of eight feet rises from her nest and melts around the cliff corner. In the nest there are the remains of 27 foxes, ten gazelles, two eagle owls and one snack—a marmot.

We have noticed Batdelger has stopped singing and seems listless. He says it's probably because he must have meat every day. Our food—freeze-dried dinners, soup, rice, potatoes, coffee and cocoa—seems not to do the trick.

To buck up Batdelger we stop at a yurt for mutton soup and milk tea. Entering a yurt from the muted tones of the steppe is like walking into a sunburst. Beautiful orange-painted wooden chests decorated with traditional blue and red designs stand against the latticed wall. The floor is covered with soft woven rugs. There is a portrait of a nationally known wrestler and faded pictures of Mongol men in Russian Army uniforms. There is also a shrine to Buddha. A fire burns in the center, the smoke escaping from a round hole in the ceiling. The family welcomes us with fermented mare's milk, cheese, soup and milk tea.

With Batdelger feeling better, we head east toward China. Although we have some permits, we don't have one for the Chinese border area, and in fact we are not exactly sure where the border begins. We bump along in a cloud of dust and spot what looks like a military outpost. It's getting dark, so we decide to ask directions. Two young, uniformed Mongol men greet us, but they are not exactly friendly. They take our passports and march back to a low-lying barrack. In an hour or so they emerge and tell us that we will have to speak to the commandant, a youngish man with a permanent frown line between his sparse brows. It's clear we're not having tiffin here.

"On another continent this is the biome the Comanche and the Sioux found," says Ellis. We see what our own Great Plains once were.

A small crowd gathers. The people pore over us and the jeep. They stare at me with my Phantom of the Opera face, the women nodding wisely as if they know what *that* means. Batdelger and Ellis are still inside with the commandant. Someone spots the mirror pole and demands to see it, as they think it is a weapon of some sort, like a giant slingshot. Lish pulls out the contraption and tries to explain how we use it to see into a nest. They just shake their heads in disbelief.

Finally Ellis and Batdelger emerge, having paid a $50 fine. As it turns out, the Chinese border is 30 miles wide and we are in it. Fast as we can, we are gone, back into the steppe. We camp in darkness, no lights, no fire, no food, for fear of attracting attention. The next morning we head for the mountains of the volcanic region where persecuted lamas hid out from the Communists in the 1930s.

As we move west from shadowed monolith to monolith, the valleys between are filled with luxuriant tall grasses. "On another continent this is the biome that the Comanche and the Sioux found," says Ellis. We camp here, and as the full moon rises we know we see what our own Great Plains once were.

Rolling through greening steppe, we cross the Chon Gol River when Batdelger, his face mottled, suddenly says, "Take me to hospital." We zoom to the town of Erdenetsagaan, where there is said to be one. Batdelger insists that we drop him off. We camp by a small river and watch shelducks being harried by hawks. We worry. Driving Batdelger to Ulan Bator is out of the question; it would take four days on nearly nonexistent roads. We have to find a way to airlift him if he can be moved. We will not think the unthinkable.

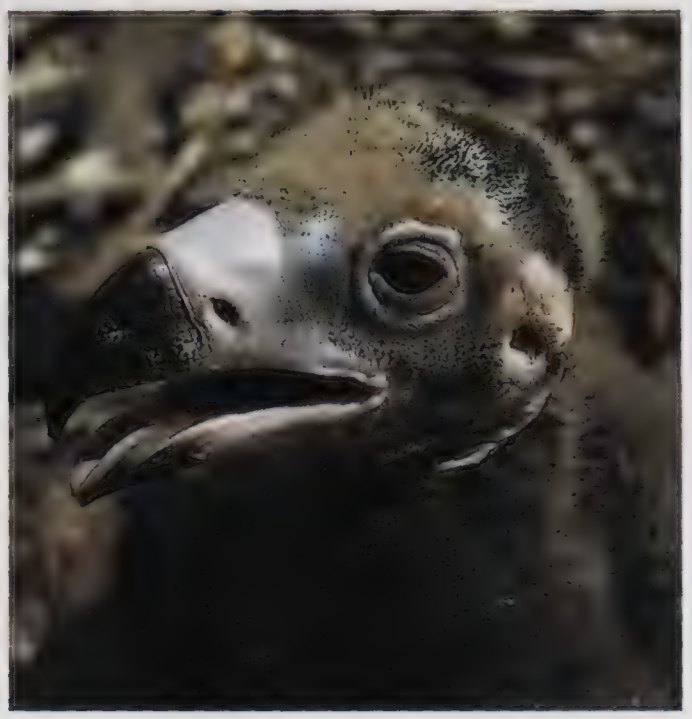
The following morning we return to the hospital; I go in to find him. I query, "Batdelger?" Women cringe from me and children burst into tears. I find myself quickly escorted into an inner sanctum where a doctor marches in and stares at me. "Batdelger? Batdelger?" I say. The doctor moves closer, peering at my face. I suddenly remember that I still look like a crash-test dummy. After a lot of struggling and gesturing, with me rapidly backpedaling from the room, I finally learn that Batdelger has spent the night in a local hotel. When we go to pick him up he is waiting for us, smiling and carrying a bag of recently butchered mutton and a quart of milk tea. Relieved, we take off again, rolling over the sweet grass plain, headed

Shetigan, an ethnic Kazakh living in western Mongolia, uses this golden eagle to hunt foxes, whose skins he sells.

for the Siberian border. A true exaltation of larks populates the landscape. Batdelger is in tune again.

Over each mountain there is a surprise: black vultures standing on a slope like Easter Island statues, a wolf on the run, a thousand speeding gazelles. We also come across a posse of 5-year-old children racing their horses bareback, practicing for the 25-kilometer race at the national games in July. Another time we come across feral camels, their dun-colored humps a comic mirror of surrounding mountains.

As we crest a hill we see what looks like a tiny parasol in the distance. Ellis pours down the steep incline heading for it. "Wonder why that elm is there all by itself," he is muttering. He seems to smell saker. Ellis climbs the tree to the aerie 16 feet up. Four young falcons try to fly away and Ellis grabs one, a female, telling us that it is a gyr falcon, a close relative of the saker. He hands her down to Lish; in short order she bites him. But Lish is used to such behavior, having worked with raptors for years. Ellis takes the bird back and calms it. Then she ruffles her feathers and stands on his arm, head erect, as if she had been doing so all her life. In fact, she sits like a fully trained bird. When it is my turn to hold the bird, I look into her large eyes and sense she'd like to kill me.



Ellis' team put a transmitter on a vulture nestling like the one above; it later flew 300 miles.

Ellis, meanwhile, has climbed back up in the tree and is talking to her baby brother, who seems to be sitting tight. "OK, little guy . . . I don't want to mess with your little mind. . . . " In outrage he yells, "He's been sleeping upside down!" As it happens, the little guy is tethered to the nest by a bit of plastic, and his leg is tangled up. Borrowing my nail scissors, Ellis frees the brother and brings him down to us, where the small male hobbles around, balancing on his good leg. Ellis puts them both back in the nest.

Then we resume tacking across the steppe, visiting marked sites that turn up a hawk family, another aerie so blown away that we can see through it and then an abandoned geological tripod several miles to the west. There is no sign of any living thing except . . . tire tracks. Homemade aeries populated by a hawk 20 miles north also show tire tracks. Once again a mother hawk floats overhead screeching while Ellis examines the two big-eyed babies for signs of hybridization.

We visit a host of other aeries on Ellis' list, and at any number there are tire tracks. We have come to think that without a doubt well-financed teams have a copy of the secret list and are now visiting the sites. Recently we have learned that falconers and their organizations have been in touch with the Mongolian government. "Well," says Lish, "if some of these guys see that building aeries works for sakers, maybe then they'll do it."

Under steely skies and roiling clouds we see the fabulous great bustard. We try to follow it but we are left with only an impression of a very long-legged goose. Later that day we see a golden eagle swoop to grab an adult marmot. In the end we have visited almost 200 aeries and not enough of them inhabited by saker falcons, as Ellis will later report. But his aerie-building resulted in 20 saker chicks plus two clutches of eggs. If the chicks were all perfect, perfect sakers, then at $20,000 apiece they'd command $400,000.

The team returns to Ulan Bator to stock up again. In this city, it's common practice to treat any car as a taxi. Late one afternoon a man in a brown wreck picks us up. Our driver, a gentle-looking man, turns to us and asks, do we want to buy some very nice young saker falcons? We do not believe him. He makes a U-turn and quickly drives us to his home. In the courtyard his brother is cooking sheep's feet. His young daughter is riding a ram's horn as a play "motorcycle." His wife emerges from a wooden dwelling with two sakers on the verge of fledging, royals trapped in a green plastic crate. The dingy, terrified birds are calling loudly, a sound somewhere between a whistle and a screech. We begin to ask urgent questions, insisting that these falcons are Mongolia's legacy. Ellis explains that buyers usually want only experienced hunters. We agree to meet the next day. We promise to help the man return them to their nest, which he says is about 90 miles east of here on the steppe. When we come back at the appointed time to effect some solution, neither the young sakers nor the gentle-looking man can be found.

Adele Conover most recently reported for SMITHSONIAN *on teaching sandhill cranes to follow an ultralight aircraft and on the plight of the nation's freshwater mussels. David Ellis is a senior raptor biologist and researcher with the U.S. Geological Survey.*

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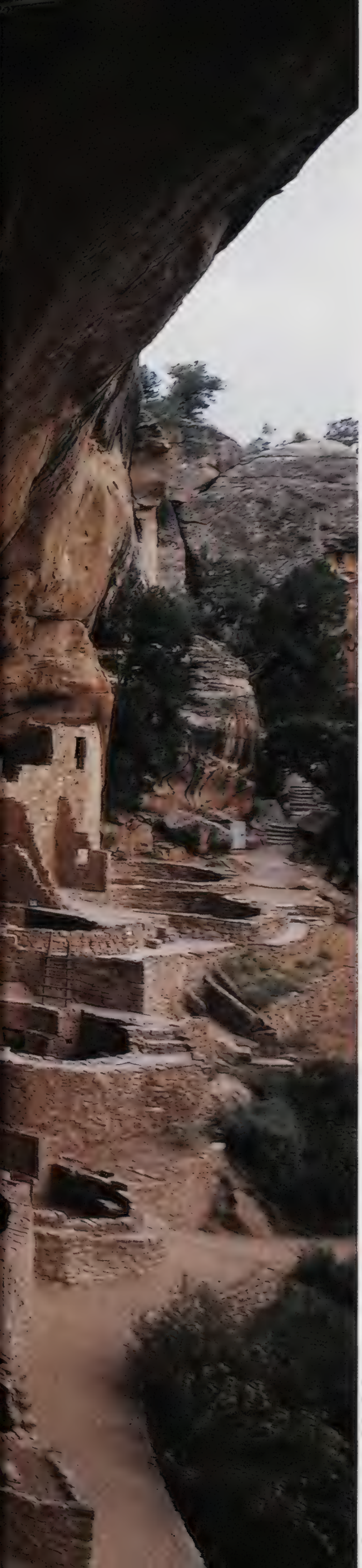
The towers and uncovered ceremonial chambers of Cliff Palace, the Anasazi masterpiece in Colorado, may have served a populace that came here only on special occasions, possibly to divide resources



A SOCIAL DIVIDE

BY DAVID ROBERTS

PHOTOGRAPHS BY TERRENCE MOORE

"THERE'S NO REASON FOR them to build that wall," said Larry Nordby. "All it does is block your way."

In the dim light, I squinted once more at the facade before me, dryly catalogued on Nordby's chart as Miscellaneous Structure 14. Eight feet tall, five feet wide, the wall had been wrought of flat, shaped sandstone slabs mortared together with brown mud, in which I could see the finger marks of the ancient builders.

We were standing in a back corridor at Cliff Palace, the centerpiece of Mesa Verde National Park in southwestern Colorado. Erected by the Anasazi more than 700 years ago, this stone-and-mud village, which fills a huge natural alcove in the canyon wall, is the largest cliff dwelling in the United States. Cliff Palace, in fact, is America's most famous ruin.

"Something dramatic happened right around A.D. 1280," Nordby went on. "Let me show you what you had to do after that date to get from one side of this wall to the other." Tagging at his heels, I followed the archaeologist as he strolled from passageway to plaza, his right hand regularly tapping a zigzag series of partitions cunningly built into contiguous rooms uninterrupted by door or window. "To do it, you have to come clear outside," Nordby explained as we emerged into the September sunlight. Then I followed him along the mirror zigzag that, after five

ARCHAEOLOGICAL RESEARCH AT CLIFF PALACE RESUMES AFTER 80 YEARS. SURPRISES ARE THE ORDER OF THE DAY

WRITTEN IN STONE

A photograph probably made in the 1890s shows the complex before Jesse Walter Fewkes undertook repairs in 1909.

minutes, delivered me to the end of the other side of Miscellaneous Structure 14.

"The wall splits Cliff Palace," Nordby concluded. "It divides the place into completely separate parts."

The great Anasazi ruin, tucked in an obscure side canyon beneath the juniper-and-piñon-covered mesa, was discovered by Anglos around 1888. Pothunters and archaeologists dug its treasures before the turn of the century. By 1906, Mesa Verde had been embraced by the national park system, which launched a vigorous campaign to restore and stabilize the magnificent village. Today, some 170,000 visitors a year queue up on the overlook above Cliff Palace, then take the ranger-led tour of the site.

One might think that, after 110 years of visitation and study, everything that could be known about Cliff Palace had been duly recorded in scholarly monographs. Yet before Larry Nordby arrived on the scene in 1995, no one had ever noticed the zigzag wall dividing the village. The fact is that, for a variety of reasons, Cliff Palace remains poorly understood. Nordby is the first archaeologist to seriously study the ruin in more than 80 years.

What Nordby was coming up with last September, toward the end of his third field season at Cliff Palace, is beginning to overturn much of the conventional wisdom about the place. The implications for our understanding of those enigmatic ancients, the Anasazi, are dramatic.

For millennia the hunter-gatherers who would become the Anasazi ranged across the Southwest, brilliantly adapted to an all-but-waterless wilderness of stern plateaus and rugged canyons. By A.D. 600 they had become semi-sedentary, planting corn, beans and squash; they had given up the spear-thrower in favor of the bow and arrow, and had begun to make pottery. Still later they climbed out of their subterranean pit houses to live in blocks of back-to-back rooms, like the ones in Cliff Palace; their boldest villages towered as high as five stories.

Only toward the end of the 12th century A.D., however, did the Anasazi start to move in wholesale fashion into the natural sandstone alcoves, where they built cliff dwellings. Why they did so remains a puzzle: many cliff dwellings look grimly defensive, requiring scary climbs up log ladders or sculpted hand-and-toe trails to enter, but others, such as Cliff Palace, can be easily walked into from the slope below.

By the middle of the 13th century, all across the Colorado Plateau the Anasazi were in trouble. Scholars tirelessly debate the causes of that crisis. The people may have hunted most of the game to near extinction and cut down most of the trees for firewood; erosion gouged out arroyos that lowered the water table and ruined crops; a severe drought beginning in 1276 may have triggered widespread famine. In any case, thanks to the exquisite precision of tree-ring dating, we know that the whole of the Colorado Plateau was abruptly abandoned within three or four years after 1295. And we know that the Anasazi never came back.

Despite more than a century's worth of theories and

explanations, the abandonment remains the central Anasazi conundrum. Cliff Palace was built largely in the last 60 years of the 13th century. The most masterly of the structures were put up in the final 15 years before the builders walked away.

The Anasazi did not vanish: we know that their descendants live today in places ranging from the Hopi reservation in northern Arizona to the pueblos of Isleta and Taos along the Rio Grande of New Mexico. (Present-day Pueblo people do not use the word "Anasazi." They have their own names for their forebears; they would prefer that others use the term "ancestral Puebloans." To them, Cliff Palace is not a ruin. And for them it is not abandoned. The spirits of their ancestors still inhabit the site and are linked to modern-day Puebloans.) But just what relationship the inhabitants of any present-day pueblo bear to the former denizens of Mesa Verde is a hopelessly muddled question. The twin disruptions of the abandonment, and three centuries later the Spanish conquest, wreaked havoc with native cultures. Puebloans today fiercely guard as secret lore their old migration and origin stories, but they make it clear that Cliff Palace is a part of their tradition. Some scholars are skeptical about the worth of oral tradition over as long a span as seven centuries. And the archaeological links between Mesa Verde and the latter-day Puebloans are only beginning to be figured out.

Cliff Palace had been the first Anasazi ruin I had ever visited, on a family vacation when I was 11. On that halcyon summer day in 1954, given free run of the place, my siblings and I had crawled into tiny living rooms and clambered down into kivas (circular subterranean chambers thought to be ceremonial) as we played at being cliff dwellers. But as visitation soared in the 1960s and '70s,

Self-taught archaeologist Al Lancaster, second from left in the 1934 picture below, headed a team that restored the square tower next to them. At left is the four-story edifice as it looks today. The T-shaped window has been reconstructed from the tower ruins (see facade below).

This three-story complex, dubbed the Speaker-Chief's House by Fewkes, includes two plazas and a kiva (ceremonial room).

the National Park Service felt it had to close off more and more of the ruin. Returning to Cliff Palace as an adult, I felt an odd dismay: the numinous Anasazi lair of my youth had turned into some kind of museum diorama. On a visit in 1994, as I did research for a book about the Anasazi, I clutched a ticket issued at the visitor's center and, joining a group of 60 other tourists, walked along a cement-paved gauntlet that wound among a handful of rooms and kivas. The tour lasted only an hour. In principle I sympathized with all the pressures the Park Service has to juggle, but 40 years after the place had sung to my spirit, Cliff Palace seemed dead.

Now, luxuriating in the privilege of reentering the inner labyrinth of the stone city, I felt Cliff Palace come alive again. I was assailed with twinges of déjà vu as I trod dark corridors between rooms and scuttled around bedrock boulders, exactly as I had more than four decades before. Despite his familiarity with the ruin and his dispassionate professionalism, Nordby himself occasionally stopped to admire the buildings, as when he paused in a discourse about stone-shaping styles, stared up at a three-story tower and murmured, "You know, it's extraordinary that this thing is still standing after 700 years."

As far as we know, the Anglo discovery of Cliff Palace took place one afternoon in December 1888, as two cowboys from the nearby town of Mancos, Richard Wetherill and Charlie Mason, out chasing stray calves in a snowstorm, rode to the opposite rim of the side canyon and suddenly beheld the ruined village (SMITHSONIAN, December 1993). Three years later, Wetherill, his brothers and Mason guided a young Swedish nobleman to the site to excavate among the tumbled room blocks. Gustaf Nordenskiold had come to Colorado hoping to cure the tuberculosis that would soon take his life, only to be fascinated by everything to do with the Anasazi. Though crude by today's standards, Nordenskiold's work was as sophisticated as any dig undertaken in the United States in the 1890s. The Swede also wrote the first monograph ever published about the Anasazi, *The Cliff Dwellers of the Mesa Verde*, a work that stands up well more than a century later. Nordenskiold was smitten by the "wild and gloomy gorge" in which the ruin lay, by the "mysterious twilight of the cavern," by "the round towers and high walls rising out of the heaps of stones . . . defying in their sheltered site the ravages of time."

In 1909, Jesse Walter Fewkes, one of the foremost archaeologists of his day, set out to excavate and stabilize Cliff Palace. In his Smithsonian Institution Bureau of American Ethnology bulletin, Fewkes declared that "the writer was able to repair completely this great ruin and to leave it in such condition that tourists and students visiting it may learn much more about cliff-dwellings than was possible before the work was undertaken." Fewkes also made a cursory interpretation of the site, although his report unfolds chiefly as a room-by-room survey. In keeping with the practice of his day, Fewkes set great store in analogies he had picked up as an ethnographer among the Hopi. Thus, counting 23 kivas at Cliff Palace, he announced, "They belonged to the men of different clans" (as kivas do today among the Hopi)—this, even though no one has ever demonstrated that the Anasazi of the 13th century even had a clanship structure. Fewkes labeled the ruin with suggestive names, such as the old quarter, the plaza quarter and the Speaker-Chief's House. He admitted that these were arbitrary designations, but then let himself slip into circular reasoning as when, discussing a feature of a certain kiva, he wrote, "This banquette probably was designed for the use of the speaker-chief."

Further—and very deft—stabilization of Cliff Palace was performed by Al Lancaster, a self-taught Park Service archaeologist, in the 1930s. But, remarkably enough, Fewkes' 1911 *Antiquities of the Mesa Verde National Park* remains the last major research publication about America's grandest ruin. Under a succession of park superintendents, preserving Mesa Verde's hundreds of ruins and presenting a select group of them to the public took precedence over doing new research.

This climate began to change with the advent of a new superintendent, Larry Wiese, in 1993. Wiese in turn brought Nordby into the park. For the first time in more than 80 years, an archaeological team set out to comprehend the phenomenon that is Cliff Palace with all the latest research tools available.

By 1995, however, excavation had virtually become a dirty word among archaeologists in the Southwest. Nordby had no hope of turning a single spadeful of dirt. Instead, he hoped to bring to Cliff Palace a battery of techniques he had developed over the years at other Anasazi sites.

In Nordby's lab at ranger headquarters, Don Corbeil, the team's historical architect, showed me some of the fruits of the survey. Thousands of photographs, field drawings and floor plans of every man-made surface in the sprawling ruin had been fed into the computer. Punching a few keys, Corbeil brought up Room 21 for my scrutiny. "The room was built around 1273 A.D.," Corbeil recited. "The east wall is 1.9 meters long, with a maximum height of 1.96 meters. The stop rod below the lintel in the doorway is made of cottonwood. That socket probably once held a roof beam of juniper."

Corbeil banged out another instruction: suddenly I saw Cliff Palace as a whole, with squiggly lines in different colors running riot across the screen. "If I want," said Corbeil, with the zeal of an acolyte, "I can highlight every piece of juniper in the ruin. Or I can isolate only the rooms built between 1220 and 1250. What we have is a vast layer cake of information."

Later, inside Cliff Palace, I listened as Nordby explained the different methods used to prepare the stone slabs from which the village had been built, such as "pecking" and "bidirectional facial chipping." He pointed out a "cold joint" in the mortar, an overlap where the construction gang had called it a day more than 700 years ago. I learned the difference between a "smoke plume" and an "oxidation plume," smudges left in the corners of rooms by long-ago cooking fires.

"If I want," said Corbeil, with the zeal of an acolyte, "I can highlight every piece of juniper in the ruin. Or I can isolate only the rooms built between 1220 and 1250. What we have is a vast layer cake of information."

Though Cliff Palace is uniformly granted to be the largest cliff dwelling in America, even the room count has been a question. Many textbooks assert that the village comprises 220 rooms; but Nordby's rigorous tally had come up with a mere 150 enclosed spaces. Because stabilization of the ruin had seemed to early savants an entirely separate business from excavation, neither Jesse Fewkes nor Al Lancaster kept detailed records of their restoration work. Today, consequently, it is not always easy to tell which walls of Cliff Palace had been erected by the Anasazi, which by Anglo crews in the 1910s or '30s. Nordby, however, had been able to deduce the signature of a "Fewkes patch" and of a "Lancaster patch."

Torii Cooper, top, and Larry Nordby use tape to mark the wall that divides the ruins.

Light streams through windows where the top of the square tower meets the rock overhang. The cream and red interior features abstract art.

He pointed out to me examples of each. "Pretty bad, huh?" he winced at Fewkes' repairs: "Look at those ugly trowel marks." But Lancaster's craft was so skillful that even with Nordby's commentary I could not readily tell it from the handiwork of the ancients.

Earlier archaeologists had assumed that any Anasazi room of a certain size had been living quarters. Nordby imposed a stricter criterion: searching diligently for the hearths and smoke plumes that proved a room had been cooked in, he and colleague Joel Brisbin came up with only 25 to 28 bona fide residential cubicles. Nearly all the other 125-odd rooms, they concluded, were apparently used for various kinds of storage, grain grinding or communal gatherings.

This meant to Nordby that far fewer people had lived permanently in Cliff Palace than anyone had previously guessed. Earlier estimates of the population of the village had ranged up to a thousand souls. Nordby had come to believe that only about a hundred people had lived here. The team could find in the great ruin only three mealing rooms—those distinctive torture chambers where day after day women had knelt and pulverized corn on their metates. "How could you grind enough corn to feed a thousand people, or even five hundred?" Nordby asked rhetorically.

Nordby began to see striking symmetries, rooms that are mirror images of each other.

What, then, was Cliff Palace all about? Why did a village with perhaps only a hundred residents need some 20 kivas for its inhabitants' ceremonies and social gatherings? Why so many storage rooms? What, besides the life-giving corn, had been stored in them?

Gradually, a speculative answer grew in Nordby's brain. He explained it to me: "What I think is that there was a caretaker population here, a smaller group to keep the site in good shape for a larger population that came only several times a year." Yet why would this be so? Such a notion of Anasazi social organization went against nearly all the accepted ideas, which held that, by and large, the ancients were a radically democratic people, with each village autonomous from its neighbors, each family looking out for its own welfare. The puzzle gnawed away in the back of Nordby's mind. Then, one day in 1996, he noticed the dividing wall.

The overall design of Cliff Palace betrays no master plan: like most Anasazi cliff dwellings, it looks as though, decade after decade, rooms and towers were added haphazardly. But in the structures built around 1280, in the last remodeling phase at Cliff Palace, Nordby began to see striking symmetries. Rooms 59 and 64, for instance, are virtual mirror images of each other; large, square chambers,

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Brenda Magouirk, top, and her husband, Michael Nelson, map a kiva. The hole in the center of the floor is a fire pit.

they share a common wall that happens to be a segment of the wall that partitioned the ruin. He saw that Kiva O and Kiva R made a matched pair, one on either side of the dividing line. And they were built between 1278 and 1280.

The most striking buildings in Cliff Palace are the Speaker-Chief's House and the square tower. The latter, four stories high, is decorated in dazzling abstract paintings. The Speaker-Chief's House is a three-story complex with two plazas, a grinding room, Kiva Q and a circular tower. The two masterly edifices stand on either side of the dividing wall.

Nordby needed further corroboration, to be sure that his hunger for symmetry was more than a wishful delusion. At the very back of the ruin, 20 feet above the bedrock floor, stretches the Ledge—a balcony in the overhanging roof of the alcove, into which the Anasazi had wedged a string of squat buildings. In the 13th century, the inhabitants had gained the Ledge via a ladder propped on the top of the circular tower, but it had been decades since any archaeologist had prowled through those rooms. Nordby hauled a long ladder into the site and climbed up to the eerie confines of the Ledge.

What he found startled him: at either end of the Ledge the Anasazi had built the largest rooms of all in Cliff Palace, two on the right, one on the left, seemingly affiliated with the two sectors of the divided village. They were probably used to store surplus food. The rooms do not appear on any of the maps made by previous researchers.

What really clinched the divided society idea came last summer. A plaster expert, Frank Matero, had come to Mesa Verde to study the mortar in Cliff Palace. One day Matero said to Nordby, "You know, I was down in Kiva Q today, and I noticed that the plaster divides the kiva into symmetrical halves."

"My eyes must have gotten as big as basketballs," Nordby told me as he recalled that moment. "The location was perfect: Kiva Q lies smack in the middle of Cliff Palace. And no residential rooms surround it." Now the archaeologist walked me over to the kiva. Sure enough, two different colors of plaster had been used to coat the interior of the chamber. The line where the colors met was so precise that I could trace it as it ran through the middle of a square niche in the kiva wall. Yet as far as we know, no one had ever noticed this peculiarity before Frank Matero.

"I imagine that Cliff Palace was some kind of redistribution center, maybe of corn, for a larger population."

What, then, did the symmetries and the dividing wall suggest was going on in Cliff Palace around 1280? Like all good archaeologists, Nordby is reluctant to venture out on a speculative limb that colleagues might delight in sawing off. But the scholar had begun to wonder whether he was detecting the architectural footprints of a social division along the lines of what anthropologists call moieties—twinned affiliations at a larger level than clan or kinship, which helped organize a society and define each member's role within it. (At Laguna Pueblo in New Mexico, for example, the people divide themselves into winter and summer "sides.")

"With all the stress the people are exposed to by 1280," Nordby ventured, "that's when things start to get tough. That's when social dislocations start to happen. I imagine that Cliff Palace, with its small caretaker population, was some kind of redistribution center of goods—maybe surplus corn—for a larger population that came to receive it. For the first time, there's a new pressure for someone to take charge: you can't just have 300 people in a room all shouting out what they want.

"I imagine the dual division of Cliff Palace around 1280 was an attempt to manage that stress. Growing population and increased contact with one's neighbors dictate that people either compete or collaborate. One way to collaborate is to develop seats of power—at Cliff Palace, these may have been the Speaker-Chief's House or the square tower. There the leaders in charge might have made decisions

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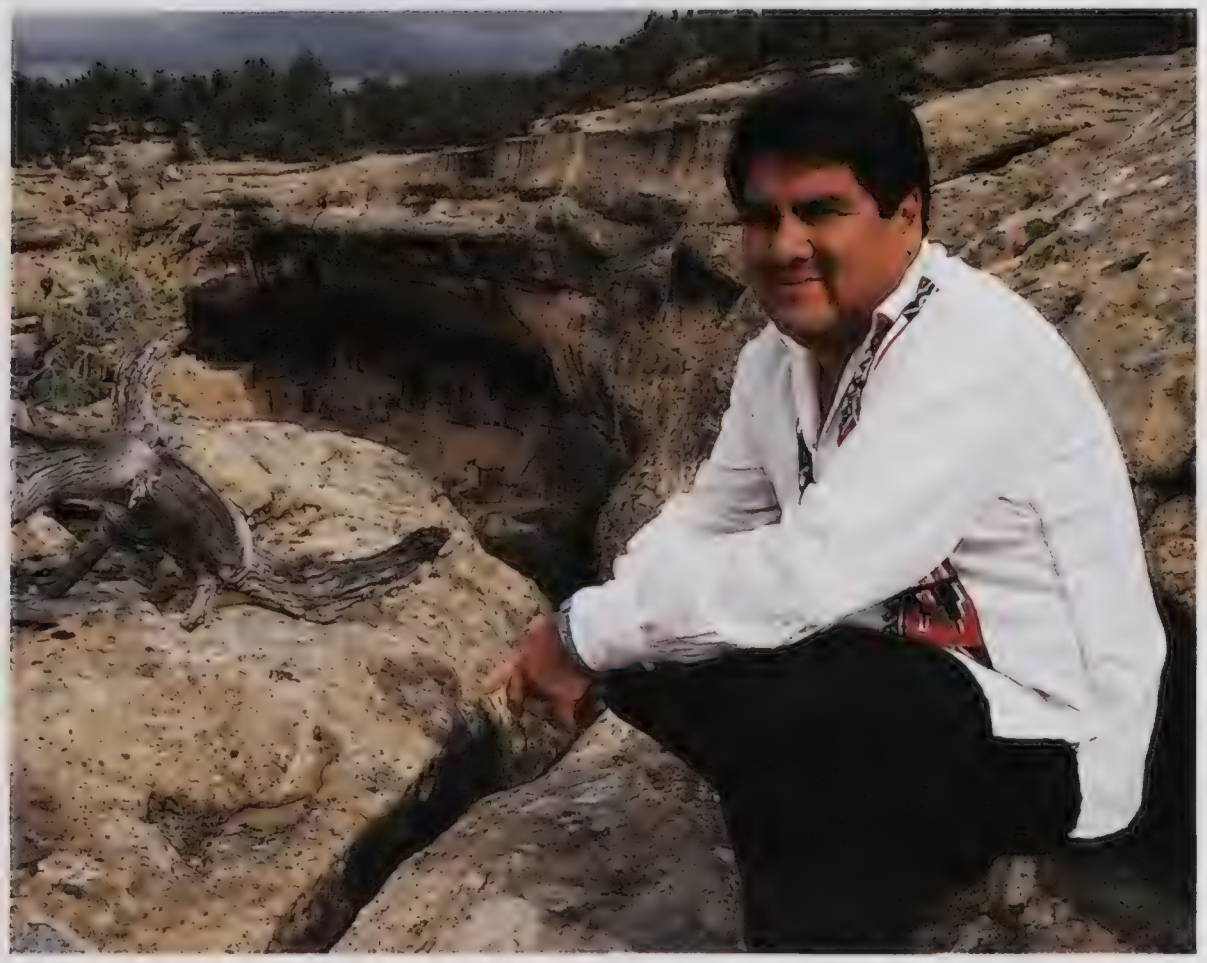

Peter Pino, tribal administrator of the Zia Pueblo in New Mexico, is a descendant of the still mysterious Anasazi. Cliff Palace can be seen under the overhang behind him.

regarding the distribution of any precious goods."

Whatever the truth of the matter, the whole system had collapsed. By A.D. 1300, probably not a single Anasazi still dwelt in the great village inside the arching alcove. The Puebloans had fled the Colorado Plateau and started life over near the Rio Grande.

During my visit last September, Nordby had invited a group of Pueblo representatives to tour Cliff Palace, to offer their insights and see the kind of work he was undertaking. At lunch I talked with Peter Pino, tribal administrator at Zia Pueblo, north of Albuquerque.

"The thing I really like about Nordby's approach," said Pino, "is that he's doing research without excavating. We Native Americans always thought this was possible, but the archaeologists told us that it wasn't possible to analyze a site without digging. We would say, 'Don't you have enough pots, enough bone tools? Why do you need any more?'"

I asked Pino about Zia affiliations with Mesa Verde. Zia Pueblo lies 150 air miles southeast of Cliff Palace. "Every December 29, in our council meeting, our migration story gets told and retold," Pino said. "It takes four or five hours to tell. There are more than a hundred names of places our ancestors passed on their way to Zia. One of the places they name is this place here. We call it *Ka-cha-ka-tru-ti*—the Vast Area with Many Houses."

Pino was inviting Nordby to bring his investigative apparatus—tape measure, camera, computer, the works—to Zia.

Larry Nordby joined us at the table on the terrace. A century of antagonism between Puebloan peoples and archaeologists is one of the sadder legacies of research in the Southwest, so I was astonished at the conversation that ensued between the tribal administrator and the scientist. Pino was inviting Nordby to bring his investigative apparatus—tape measure, sketch pad, camera, computer, the works—to Zia to see what science could add to their saga.

"When the Spanish came in 1540," said Pino, "we lived in five different villages. We had a population of 7,000 to 15,000 people. Today, we're only 860. We still know where the other four villages are. Our traditional stories don't talk about time periods. One day can equal a hundred years. We could utilize your work." The Puebloan nodded at the archaeologist. "You could give us dates within fifty or a hundred years."

As Pino went on to describe one of the ancestral sites that few if any Anglos had ever seen—a cliffside ruin guarded by a pair of eagle petroglyphs—I marveled at the exchange. It was entirely possible that Peter Pino's forefathers had built Cliff Palace. The Spanish had ruthlessly suppressed Pueblo religion, driving it underground. Two generations of Anglo ethnographers had taken what they could of the people's secret oral traditions, only to see a third generation of archaeologists reject that wisdom as superstitious folklore. Yet here, in a Park Service cafeteria, a descendant of the Anasazi and a scientist trained in Western skepticism were reaching across seven centuries of silence to join hands. Thanks to them, and their colleagues in the new collaboration between archaeologists and Native Americans that this lunchtime chat might portend, the truth of what happened so long ago at Cliff Palace might begin to creep into the light.

David Roberts has written most recently on the Frankincense Trail in Yemen and the Tarahumara of Mexico's Copper Canyon. Terrence Moore is shooting photographs of earthen houses for a new book.

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BAR CODES:

reading between the lines

BY ED LEIBOWITZ

THEY WERE STRANGERS TO THE CITY OF SAN FRANCISCO. In their sober suits and muted ties, they could easily have been mistaken for a group of bewildered conventioneers as they made their way up a labyrinth of steep, unfamiliar streets, then down again toward the Bank of America Tower. The technical consultant from H. J. Heinz was among their number, as was the assistant controller of Del Monte and the electronic data processing manager from Procter & Gamble. The work they began that morning of January 4, 1973, would eventually impress itself upon every soft-drink bottle, every tube of toothpaste, every new novel, every magazine and newspaper, and every pop disk from Bing Crosby to the Beastie Boys. These men did not know San Francisco, but no American city, prosperous suburb or impoverished hamlet would escape the fruit of their labors.

The eight members of the Symbol Selection Committee had arrived to give birth to the Universal Product Code or UPC, now more familiarly known as the bar code. They would hear presentations from RCA, IBM, Pitney-Bowes and four other companies with competing prototypes for a laser-scannable icon meant to automate the checkout counter. By sheer coincidence, a religious cult had reaped some sizable press by predicting that on that very morning all life on earth would cease. "If the world ended," the committee's corporate counsel Stephen Brown later joked, "our last views would have been of one of the world's most beautiful sites—San Francisco Bay." RCA, with its smart scannable bull's-eye, seemed to be an early favorite, while obscure contenders like Charecogn and Resources for Lawyers were not strongly in the running. IBM's symbol—a cluster of black stripes of variable thickness on a white rectangular field with ten identifier digits emblazoned along its bottom—was not yet a fully known quantity.

It was a harsh inflationary climate that had led usually uncooperative supermarket executives and a few food manufacturers to join forces in the early 1970s. Their Ad Hoc Committee on a Uniform Grocery Product Code was to establish a standard product identifier for all packaged foodstuffs, regardless of where they were sold or manufactured. They were also given the task of coming up with an automated checkout stand to process this universal ID. The Symbol Selection Committee was spun off to choose the icon.

Near despair drove the bar code's creation. Supermarket net margins, which rarely crept over 1 percent in more profitable times, had sagged to .6 percent by 1970. While the industry had limited control over soaring prices for groceries and rising rates for shipping, commercial space, air-conditioning and other services, one enormous expense was malleable. They could halt the slide by "improving productivity," or reducing personnel.

In the early 1970s, supermarket employees formed a well-paid, unionized workforce. Lawrence Russell, a consultant to the Symbol Selection Committee, recalls the checkout clerk and bagger eating up a full quarter of a supermarket's gross margin. By automating the checkout line, the clerks might use the time saved to bag the groceries themselves. Price labeling might be eliminated to further cut down payroll and boost profits. Human error in ringing up prices, which was usually in favor of the customer, could also be minimized. "That looked pretty juicy," says Russell, now president of the Information Services Group at Unisys, "a potential tripling of profitability."

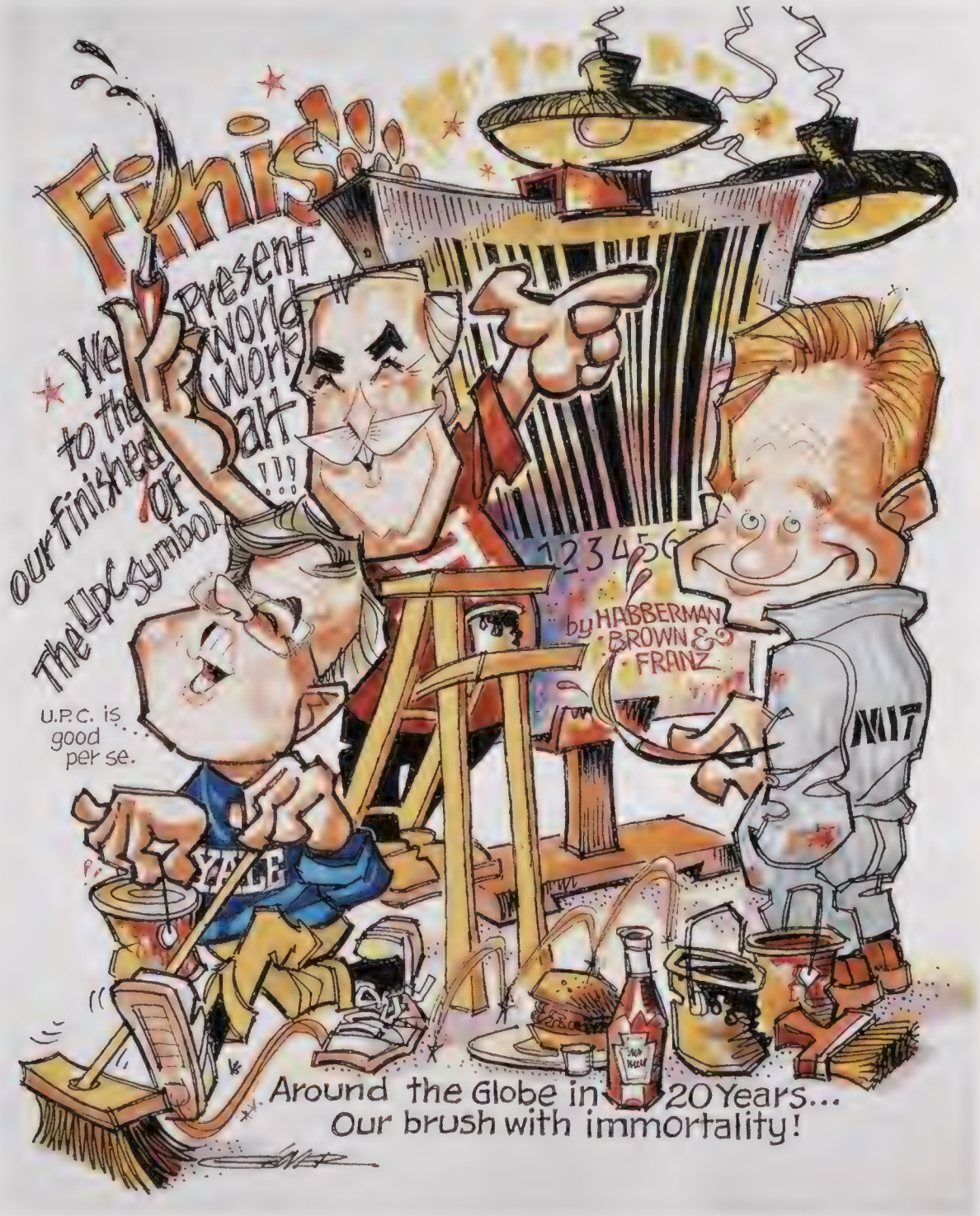
The red glow of an omnidirectional, or "starburst," laser scanner reads the price and other product data encripted in the bar code on this 12-ounce can of Campbell's soup.

The work they began that morning of January 4, 1973, would eventually impress itself upon every soft-drink bottle, every tube of toothpaste, every magazine, and every pop disk from Bing Crosby to the Beastie Boys.

For Alan Haberman, the selection committee chairman, the supermarket industry's predicament was more deeply felt. "While the rest of the world was sending people to the moon and playing around with computers, nobody in the technological world wanted to work in the supermarket business, because it was such a low-profit industry. The business was literally in the backwash of technology." His portrait of the checkout stand on the eve of automation is just as dismal, suffering from more than high labor costs. "As an industry, we were so damned conscious of the fact that the checkout experience was the least pleasant experience in a store. It was the thing that people hated! They hated having to wait in line! They hated having to watch the checker's action. It was an unhappy place."

"This little footprint is like the tip of an inverted pyramid, and everything spreads out from it."

A 1993 cartoon celebrating the bar code's 20th anniversary caricatured three members of the Symbol Selection Committee (from left): corporate counsel Stephen Brown, chairman Alan Haberman, and engineer Barry Franz.



How strange that the checkout line—this unhappy place, this technological backwater—should have pioneered a symbol that has transformed not just the supermarket but mass retail worldwide. During the 25 years since its adoption, the bar code has blossomed by the thousands in every American household. It has found its way into refrigerators and kitchen cabinets, bookshelves and broom closets, bathrooms and bureaus. On just about any consumer good imaginable, the ubiquitous icon comes compulsory, as part of the purchase price.

Through its formidable database, the UPC has allowed such retail giants as K Mart and Staples, Wal-Mart and Office Depot to track customer buying habits worldwide and to adjust billions in inventory accordingly. Its use has expanded through the distribution and production chain to encompass wholesale shipments and raw materials. And it has spun off a multitude of other codes and a computerized identification movement in which human blood, overnight packages, dry cleaning, university students, antidepressants and endangered animals are identified by a laser-driven scanner.

"This little footprint," Haberman marvels, "has built a gigantic structure of improvements—of size and speed, of service, of less waste, of increased efficiency. This lousy little footprint is like the tip of an inverted pyramid, and everything spreads out from it. It's a very dramatic story."

NORMAN JOSEPH WOODLAND WAS determined to invent something of consequence for postwar America. A mechanical engineering instructor at Philadelphia's Drexel Institute of Technology in the late 1940s, Woodland had already formulated a method to improve elevator Muzak by recording 15 simultaneous tracks onto 35 millimeter film—a major innovation

ARTHUR TOVE STONE IMAGES, P.131 PHIL DEGGINGER/TONY STONE IMAGES

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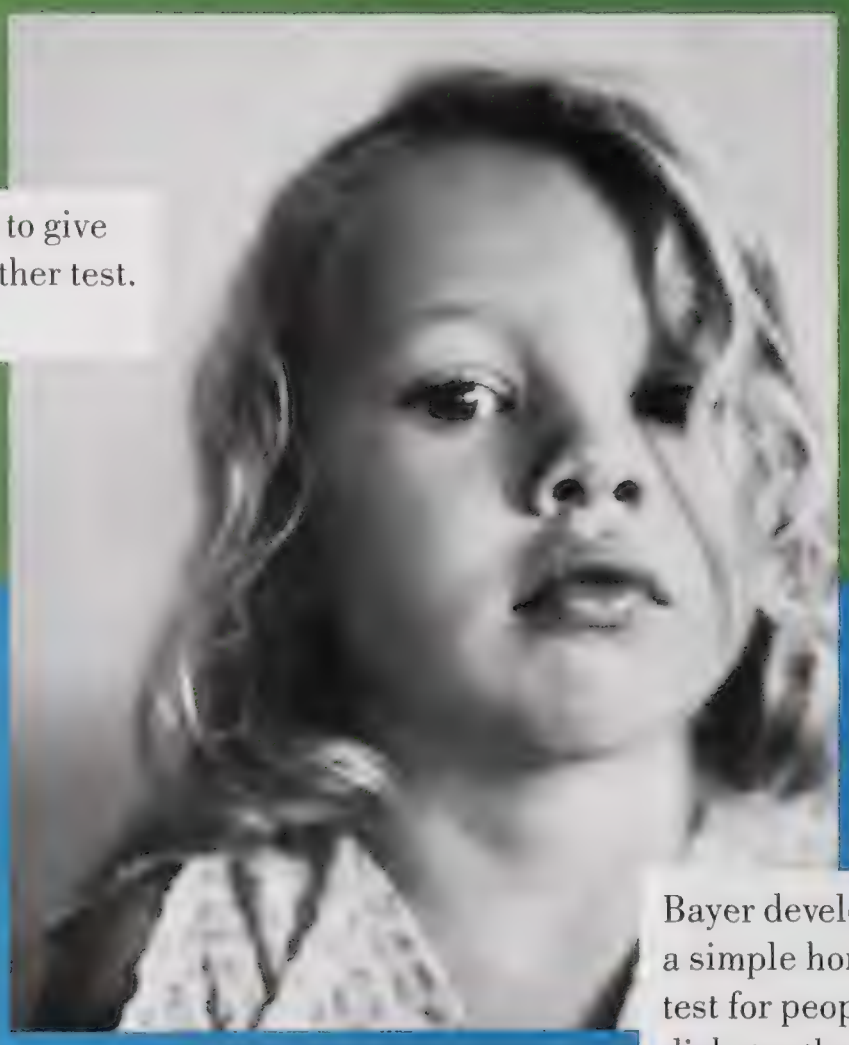

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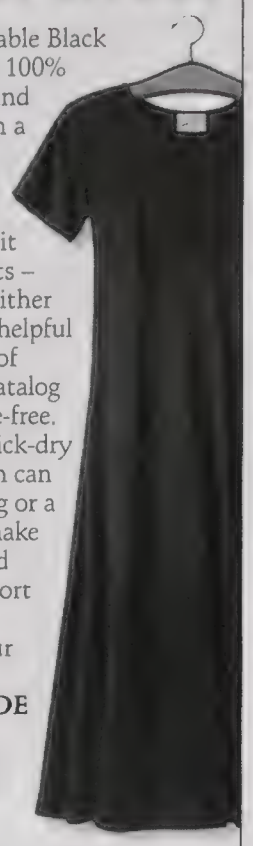

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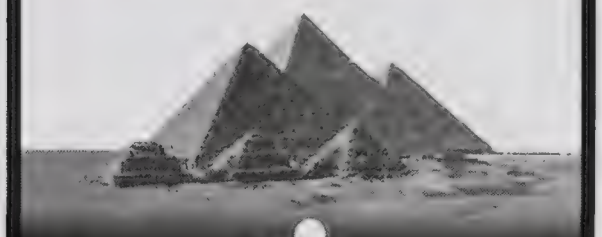

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The cover of the October 1979 issue of *Mad* magazine boasted a valiant attempt by Alfred E. Newman to mow down the bar code.

over reel-to-reel tapes and record albums. But Woodland's father convinced him to drop the venture, warning him that he'd heard that Muzak was controlled by the Mob.

A fellow instructor and friend of Woodland's, Bernard "Bob" Silver, overheard a supermarket executive trying to sell the Drexel dean on a research project to automate the checkout counter. The dean declined, but Silver and Woodland began pursuing the concept themselves. Their first solution was to fashion a grocery icon out of different colors of fluorescent ink that could be identified through a tunnel of black light.

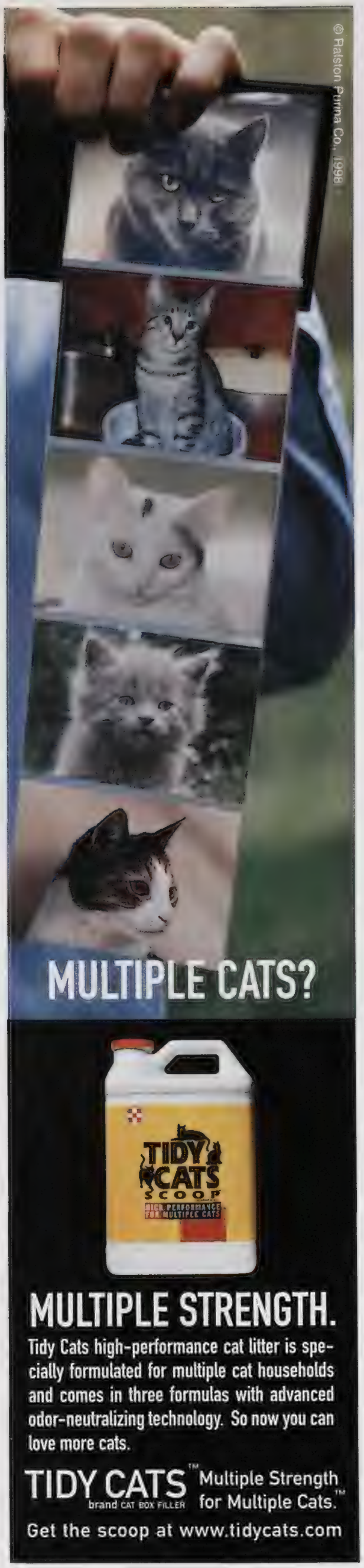
After making a quick killing in the stock market, Woodland left Drexel and spent the winter of 1948 musing over retail automation at his grandparents' apartment in Miami Beach. He had already rejected a multicolored fluorescent code in favor of a scannable bicolor icon, but the only code he was familiar with was Morse, which he had learned in the Boy Scouts. One calm January morning as he sat ensconced in a beach chair, the surf drumming in his ears, he was hit by a solution as hard as Newton's apple. "What I'm going to tell you sounds like a fairy tale," Woodland, now 77 and retired in Raleigh, North Carolina, warns. "I remember I was thinking about dots and dashes when I poked my four fingers into the sand and for whatever reason—I didn't know—I pulled my hand toward me and drew four lines. I said, 'Golly! Now I have four lines and they could be wide lines and narrow lines, instead of dots and dashes. Now I have a better chance of finding the doggone thing.' Then only seconds later, I took my four fingers—they were still in the sand—and I swept them around into a full circle."

The inventor realized that any supermarket icon might pass through the scanning mechanism right-side-up, upside down or sideways, yet would still have to be recognized as the same image. Otherwise, the checkout clerk would waste too much time precisely orienting each can of soup or box of cornflakes. Looking at the concentric circles in the sand, Woodland knew he had found a true omnidirectional symbol. He created a scanning device for his icon and persuaded Silver to design an electronic decoder for the system. In 1952 they were issued a joint patent. Woodland took a job at IBM, hoping that he could interest the company in developing his invention. In 1959 he finally succeeded, and while carpooling with other IBM engineers, would talk checkout-stand automation. One of his colleagues made an unusual suggestion. "I don't know if he was joking or not; he was the kind of guy who might have been serious about it," Woodland recalls. "But he said that if you march a regiment under a scanner, with bull's-eyes on their helmets, you could find out who was AWOL."

Woodland went on to complete a working checkout-stand prototype, but feasibility studies led him to recommend that the project be shelved. Before the advent of cheap low-power lasers, his automated method proved far more expensive than ringing up and bagging. Woodland resolved, however, to stay at his job. When IBM offered to buy their patent a short time later, Woodland and Silver rejected the offer because they felt it was too low. A few weeks later, an attorney representing the Philco Corporation called Woodland and bought the bull's-eye patent for what they were asking—a price Woodland guards to this day.

IT TAKES TWO TO TANGO, THE cheerful brochure explained, "and it takes two to make food shopping better . . . YOU . . . and your SUPER-MARKET! With the cooperation of RCA Corporation, whose electronic wizards created the new scanner checkout now being tested at the

During the 1970s, *Mad* had fun spoofing the bar code. In the April 1978 issue, it projected what might happen when that "ugly little example of 'op art'" takes over completely.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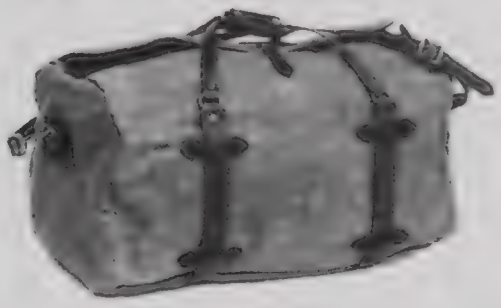

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In July 1972, Kroger's Kenwood, Ohio, store was relaunched as the country's first fully automated supermarket. Its foodstuffs were slapped with adhesive labels bearing the Woodland/Silver bull's-eye obtained by RCA from Philco. Engineer Francis Beck led the RCA team of "electronic wizards" who built the automated checkout stands. Beck himself coauthored the patent design for a checkout stand with a stationary laser that allowed clerks to drag groceries past the beam and drop them directly into the bag. He spent hours at the Kroger store gazing at the shoppers. As he remembers it, customer response was reassuringly muted as food destined for their tables was dragged past the flashing red laser. "As happens a lot, people seem to take these things in stride," Beck says. "If someone would have fired a can of peas at my head, I would have remembered it."

In the winter of 1973, one of Beck's prototypical checkout stands was donated to the Smithsonian's National Museum of American History. The ceremony celebrating the bequest was jovial and somewhat informal, with the historic stand serving as an impromptu bar. In honor of the bar code's 25th anniversary, the Smithsonian is planning to hold a special seminar on the UPC sometime next fall.

WHEN THE SYMBOL SELECTION Committee met in San Francisco in early 1973, RCA alone could claim five months of successful in-store scanning. Having dropped supermarket automation and having missed out on the bull's-eye patent, IBM dispatched an ombudsman to fight for its hastily developed rectangular bar code. Harboring some singular qualifications, the ombudsman held a preliminary meeting with committee chairman Alan Haberman, who told him straightaway that RCA had said that someone from IBM would try to make the bar code a more complicated issue than it was in order to make IBM's design more attractive. "I too thought that it wasn't that complex when I invented it in 1948," explained IBM's ombudsman, Joe Woodland, whipping out his patent for Haberman's inspection.

Thus Woodland set about defeating his own bull's-eye design in favor of the rectangular symbol invented by

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When Kroger's Kenwood, Ohio, store became the country's first fully automated supermarket in July 1972, Banquet Foods (then a division of RCA) agreed to have the Woodland/Silver bull's-eye printed directly on its packages.

his colleague, IBM senior engineer George Laurer. By 1971, RCA had seemed so far ahead in the symbology game that Laurer's boss had ordered him to simply develop technology to support the bull's-eye. But when his supervisor went out of town for a few weeks, Laurer recalls, "I played a game of 'bet my job.'" He had examined the bull's-eye and determined that "there was no way in the world that that was going to do it." Unlike the bull's-eye, his rectangular symbol could be lopped down to half its height and still be read omnidirectionally by the scanner. It was also

"If someone would have fired a can of peas at my head, I would have remembered it."

less subject to distortion when spat out on the crude printers that were then the industry standard. Thus, on his own initiative, Laurer designed an iconography for the mass retail age.

Hemmed in by legal entanglements, IBM couldn't demonstrate an up-and-running system to the Symbol Selection Committee, but it could dredge up doubts about the RCA bull's-eye. It was said to take up too much "real estate," or valuable product promotional space on the label; it was unable to be reduced sufficiently to fit on candy bars or packs of chewing gum; it was too distortion-prone.

Since the winning supermarket symbol would remain in the public domain, the property of no single company, all the competitors were encouraged to build equipment for whichever one was chosen. But, according to attorney Stephen Brown, RCA had floated an ultimatum. "They essentially were presenting us with, 'You play with our marbles or we're going to go home.'" Then, a

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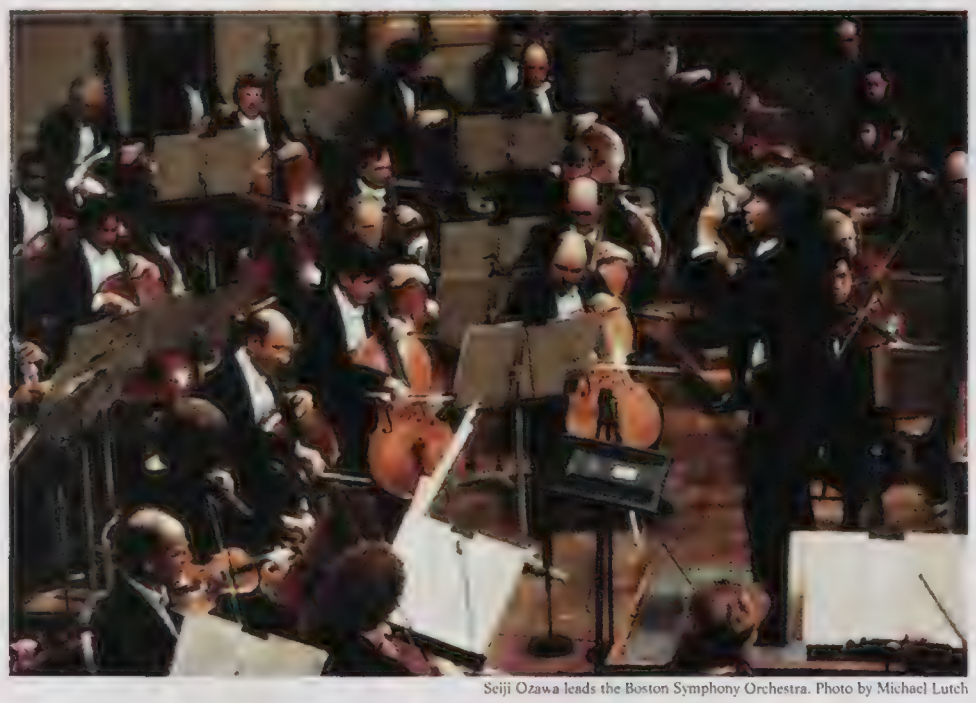

Seiji Ozawa leads the Boston Symphony Orchestra. Photo by Michael Lutch

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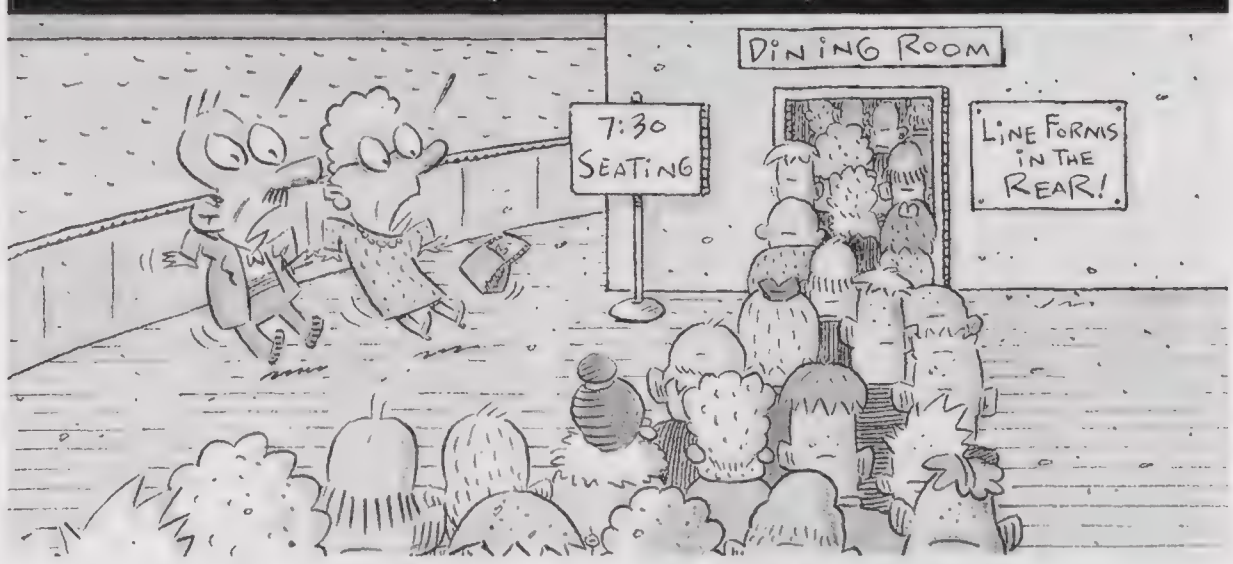

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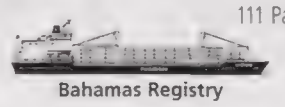

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fresh-faced young presenter from IBM picked up where Woodland left off. Bereft of a demonstrable checkout stand, he wowed the committee with theatrics. "He was a big man," Brown remembers. "Sort of a glorified country boy."

In an era before PCs, the committee had fretted over how to cram thousands of grocery item numbers and the necessary processing power into a computer. No problem, said the country boy. He reached into his pocket, pulled out a chip about the size of a half-dollar and announced, "We've got it down so that the computing capacity required for this can be placed on one chip." Brown recalls, "The fella who was sitting next to me said, 'My God. They've got a whole system developed and they've never shown it to anybody.'" Of course, Brown can't say for sure what was on that chip. "It may have contained nothing," he says, "but we were convinced they had a system. That was extraordinarily impressive."

The decision was unanimous. IBM's rectangular symbol was embraced with only a few modifications, and on April 3, 1973, the Ad Hoc Committee unveiled the Universal Product Code to the world. A little more than a year later, on June 26, 1974, a jumbo pack of Wrigley's Spearmint gum bearing the UPC code was dragged past a newly installed laser at Marsh's Supermarket in Troy, Ohio, earning its 15 minutes of fame as the first consumer item with the IBM icon ever to be scanned.

Twelve digits run across the bar code's bottom, topped by 29 light and 30 dark lines that render those digits into a laser-scannable computer language. The first digit defines broad categories: produce, health-related items, standard packaged foodstuffs. A nonprofit corporation called the Uniform Code Council (UCC) assigns a five-digit sequence to a given manufacturer, such as the number "30000" for the Quaker Oats Company, while the manufacturer doles out subsequent five-digit units of UPC to identify different products and sizes. Thus the scanner will read "30000 06110" as a pound of Quaker's Cap'n Crunch cereal, or "30000 01020" as an 18-ounce container of Old Fashioned Quaker Oats. The final UPC digit ensures that each one of the passing items has in fact been correctly scanned.

The UPC has given birth to a new generation of codes. Top: A two-dimensional code encapsulates the entire Gettysburg Address. Bottom: The multicolored Ultracode contains information in three dimensions.

Although the symbol would eventually become invisible in its omnipresence, one can certainly understand how shoppers during those first few months perceived that strange apparition on their cans of corn and cartons of milk—decipherable to a laser but not the human eye; a truncated piano keyboard viewed through a virtual haze of hallucinogens.

SITTING FOR HER MAKEUP, CAROL Tucker Foreman, then president of the Consumer Federation of America, was a bit startled as Phil Donahue

wagged a giant jar of peanut butter beneath her nose. "What's this?" Donahue asked, drawing her attention to the black-and-white icon. "Oh, that's the Universal Product Code," Foreman answered. The supermarkets, she explained, are going to take the prices off the groceries, put them only on the shelves, and use these automatic scanning symbols instead of stickers to ring up the bill.

For this, Foreman's TV debut in the spring of 1974, she had intended to make the case for a federal consumer protection agency. Armed with his peanut butter, the talk-show host decided instead to launch an anti-bar-code crusade, railing against the bizarre symbol that would in time consign colorful little price tags and their sticker guns to oblivion. "Phil Donahue was really good at what he did," Foreman recalls. "I didn't realize it at the time but he very quickly thought, 'A crusade is a heck of a lot more fun than another government agency.'"

Before a live television audience, Donahue and Foreman reprised their preshow discussion and were met with horrified gasps. Could the supermarket price sticker, the only means a consumer had to measure food prices in the inflationary maelstrom of the Nixon-Ford era, be eliminated entirely? "The women were clearly agitated by this," Foreman says. "And Donahue whipped them up a little to get them even more agitated." Close-ups of the offending jar of peanut butter followed, and Donahue's call-in phones lit up like mad. Finally, Donahue asked Foreman what she was going to do about it. "Well," she replied, "your viewers

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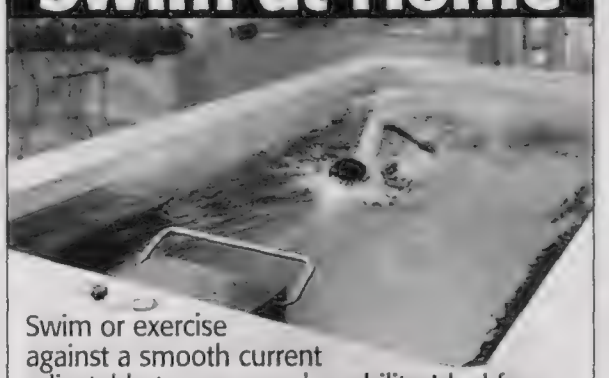

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should send money to the Consumer Federation, and we'll use their money to fight it."

The bar code's creators had never preoccupied themselves much with customer satisfaction. "The committee focused on improving business efficiencies, with any consumer benefit a fortuitous by-product," Stephen Brown wrote in *Revolution at the Checkout Counter*, his comprehensive insider's account of the UPC. Small business benefits had been just as hazy. "Independent guys over the years beat the chains because they were their own computer," explains Lawrence Russell, the Symbol Selection Committee consultant. "The really successful independents, as a natural part of business, were asking people what they wanted." The bar code gave national chains a similar edge. Every time a can of peeled tomatoes is scanned in a Safeway supermarket, for instance, it's instantly

logged into a massive database that can track the purchasing habits of customers by region, city, neighborhood or particular checkout stand. The bar-code-generated register tape may even spit out a discount coupon for a competitor's brand or a news flash about this week's special on sweet potatoes, to accompany your already-purchased ham.

Given rampant inflation, the early '70s beef boycott and the general atmosphere of social struggle lingering from the Vietnam War, Foreman cannot comprehend the industry's lack of foresight. "They were making this change in an era of protest," she says. "There was a demonstration about everything in those days! You had an industry that was full of middle-aged men and consumer groups full of younger women who were tasting the first fruits of a new wave of feminism."

Bar-code identification has found its way just about everywhere, from the thoraxes of honeybees to bags of human blood.

One of the industry proposals was to hand out grease pencils so shoppers could mark prices on groceries before throwing them in the basket.

"I thought that was arrogance in the extreme," says Foreman. "'We're going to change our way of doing business without really asking your opinion. And if you don't like it, here's a grease pencil so you can do the work yourselves.'"

A 1979 study conducted by two Marquette University marketing professors revealed the obvious—that "shoppers at a store with item prices removed had a lower level of short-

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term awareness than shoppers at a store with marked item prices." More recently, the California Public Interest Research Group, drawing upon 1996 statistics from that state's food and drug administration, claimed that, absent item pricing, consumers were overcharged as much as $250 million a year due to database input errors. But neither of these critical studies tackled the more elusive issue of how many thousands of additional items are now being sold each day because consumers no longer have the luxury of suffering what was once called "sticker shock"—seeing the high cost of a product staring them in the face as they're about to load it onto the checkout-counter conveyor belt, then tossing it aside at the last second.

The supermarket industry forestalled some legislation to preserve price stickers through vigorous lobbying and educational visits to supermarkets with elected officials. California, however, along with some 20 other states, did pass compulsory item-pricing legislation in the late 1970s. But in California, for example, fines range only from $25 to $500, and the law has been so universally flouted that only a public-policy advocate would know it exists. In fact, the whole issue of item pricing has been obscured as new generations of consumers have entered the economy with few memories of grocery price stickers. Other bar-code detractors would emerge—privacy advocates concerned about the gathering and cross-referencing of a consumer's scanned data and Internet revelationists, who interpret an incipient human bar code as the mark of the beast. None, however, have managed to muster widespread concern.

Not 18 years after Phil Donahue introduced his audience to an unknown terror, the bar code would become so much a part of daily commerce that President Bush, bewildered by a next-generation scanner during a 1992 grocers convention,

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would appear hopelessly out of touch with the everyday American consumer. Now, even the wholesale reshaping of the supermarket has become a distant memory. From an average of 12,000 square feet in the early '70s, the supermarket has grown to 25,000 square feet. Once typically stocked with 4,000 or 5,000 grocery items, it is currently able to offer as many as 25,000, because of the bar code's tight inventory control.

Carol Foreman, who now lobbies for progressive interest groups as well as for firms such as Procter & Gamble, says that "it's been years since I've run into anyone still grumpy" about sticker removal. "I myself like my life to be just as easy as it can be, thank you very much." For price comparisons, she can rely on her bar-code-generated checkout slip, which contains the brand name, size and cost for each and every item. She also admires the bar code's ability to keep track of a once-unmanageable inventory, and the supermarkets' ability to reorder accordingly.

SoHo artist Bernard Solco has made a series of paintings inspired by bar codes, such as *MaxiCode 1* (above), his rendition of the code used by UPS.

EVEN IN THIS BLAND COMMERCIAL stretch of Dayton, Ohio, there are far more alluring attractions than the longtime headquarters of the nonprofit Uniform Code Council. Until last December, this squat one-story tan building was where applications for every nationally recognized UPC in America would be sent; where they would be processed, assigned and their specifications dispatched; where company questions or complaints about bar codes could be asked and answered.

Turn onto local route 725, and you are soon reminded of the mass retail climate that has bloomed so vigorously through the leveraging of the bar code. You pass CompUSA, TJ MAXX, Rite Aid, Babies "R" Us, Best Buy and Barnes & Noble, all overstuffed with millions of consumer goods whose scannable icons can trace their genesis back to that single unimpressive building.

As of last winter, the UCC headquarters was employing only 67 Ohioans, a number that would seem immodest given the organization's original vision. Adhering to the provincial goals of the supermarket industry, the first head of the UCC was hired with the understanding that he would reduce his hours by 20 percent each year for five years, until he had worked himself out of a job. Afterward, his lone assistant would stay on to allot five-number prefixes for every manufacturer who cared to have one, leaving manufacturers to assign additional numbers for various products and sizes on their own.

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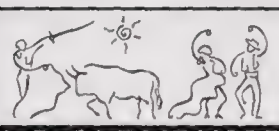

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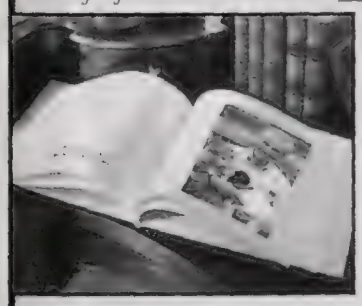

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A talk with current UCC president Tom Rittenhouse reveals a grand departure from that provincial vision. "In our business," Rittenhouse says, "if you're not global, one has to question how long you can survive, because supply-chain management, including electronic commerce, is all global." In 2005, in concert with international numbering associations, Rittenhouse will preside over the implementation of EAN-13, which will harmonize the UPC with the codes of Europe and the rest of the world. In order to better orient the UCC toward international commerce, Rittenhouse has recently moved his corporate offices just outside Princeton, New Jersey, leaving only the customer service staff in Dayton.

While the UCC was a relatively late convert to global economics, the organization can take early credit for a retail transformation almost as extraordinary—the elevation of speed to a sales tool as powerful as reduced prices or boundless variety. The automated checkout counter preceded pay-at-the-pump gasoline, ATM banking, Internet billing and other innovations that have hastened the pace of mass commerce. "The time-starved consumer," says Rittenhouse, "has found efficient ways to get the job done in record time. And speed is a major consideration."

The compulsion for ever-greater speed has spurred attempts at further retail automation. Under South Africa's pie-in-the-sky Supertag system, a cart full of groceries is merely shoved through an electronic tunnel, and the customer is checked out. The items are identified through radio frequencies, not laser-scannable icons. Via these same radio frequencies, some New York City and Washington, D.C. commuters are having tolls charged to their credit cards without even braking at the booth. Italian motorists are sped along by a similar system. In a mega-bookstore scenario, a clerk can roam the aisles with an RF

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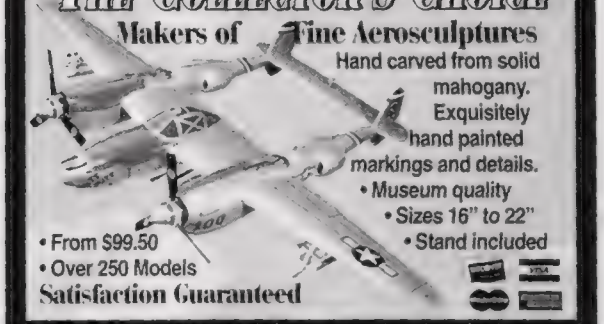

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device and locate an errant copy of *Charlotte's Web* that has somehow found its way into the travel section.

Bar-code acceleration has already started to spread from retail to raw materials. "In the ideal world," says Kevin Sharp, executive editor of *ID Systems* magazine, "as soon as you've bought a pair of green Levi's from Wal-Mart, not only is Wal-Mart going to order another pair, but their marketing department will know that green, which last year didn't sell for squat, is going to be big this year." Instantaneously, the retailer notifies Levi Strauss to start shipping more green pants and fewer purple ones. The manufacturer notifies its fabric supplier to step up production on green bolts; the fabric supplier orders its dye company to stop churning out purple in favor of green; and Wal-Mart gets stuck with fewer purple pants on its winter-clearance rack.

Similarly, an expanded bar code on a package of chopped meat will not only contain the weight and price, but will identify the plant that processed this pound of ground round and the time period in which it was produced, so that if the package proves to be tainted, the manufacturer won't have to recall every package from every plant.

The Sunbelt supermarket chain Winn-Dixie has installed self-checkout lanes in several states. Built by Productivity Solutions, Inc., the system, originally called the CheckRobot, allows consumers to scan their own groceries without the assistance of a retail clerk. The manufacturer predicts a cost savings of 20 to 40 hours of paid labor a week per checkout stand. Since all items must pass through a security module, any shopper trying to put one over on the system will have his items automatically kicked back for rescanning. "If you scan in a lemon and switch it for a T-bone steak," says Winn-Dixie PR director Mickey Clerc, "it'll know."

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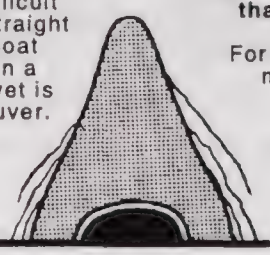
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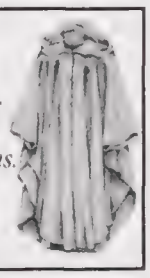
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Toys "R" Us brought the concept of laser-driven self-service to some of its youngest customers. With parental consent and help, children were able to create a kind of high-tech letter to Santa by roaming the aisles and pointing handheld scanners at Barbies, baseball bats and bicycles. Toys "R" Us then generated personal computerized wish lists that could be accessed at any of their stores by Grandma, Uncle Bert or Mr. Claus.

In this climate of self-service, automation and speed, a lack of human contact can be preferable even during some of life's most intimate retail experiences. At the national discount

"If you scan in a lemon and switch it for a T-bone steak, it'll know."

store Target, engaged couples and expectant mothers line up at the customer service desk; there, they can register for Club Wedd, the company's bar-code-driven bridal registry—which offers a scanner gun to be carried down the aisle in advance of flowers—or for its Lullaby Club, a computer-driven registry for new arrivals.

Still quite mobile in her maternity overalls, Christine Corona, 7½ months pregnant, walks up to the Club Wedd/Lullaby Club kiosk. Although she has already registered for her baby shower, Corona, a 20-year-old medical-billing associate, has dropped by a Los Angeles Target this Sunday afternoon to revise her list. Aided by a computer-generated voice and a touch screen, she prints out her personalized registration sheet. Accompanied by Nichol Granero, the baby's godmother-to-be, Corona checks out an LRT ETR Spectrum 1 Laser Radio Terminal, which looks like a sci-fi handgun with a calculator grafted on

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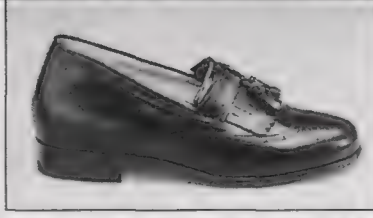
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top. Locating a particular infant swing, Granero points the handheld terminal at the bar code on the shelf, but Corona knows better. "You have to scan the box," she explains, whipping around the cardboard container, finding the oversize icon and firing her weapon at it.

An Elmo dribble cup, a teddy bear and a pair of booties are scattered about the carpet of the baby aisles, but Corona navigates easily amidst the merchandise, unleashing her laser on a baby Bugs Bunny washmit, burp-free bottles and an Honors Baby Terry Cloth Changing Table—in all, a blinding 43 items in only 15 minutes.

With a third blast of the laser, she managed to excise the excess Genie herself.

On a past excursion, she explains, she accidentally pulled the trigger for the Diaper Genie twice, but even that didn't require outside sales help. With a little reverse programming and a third blast of the laser, she managed to excise the excess Genie herself.

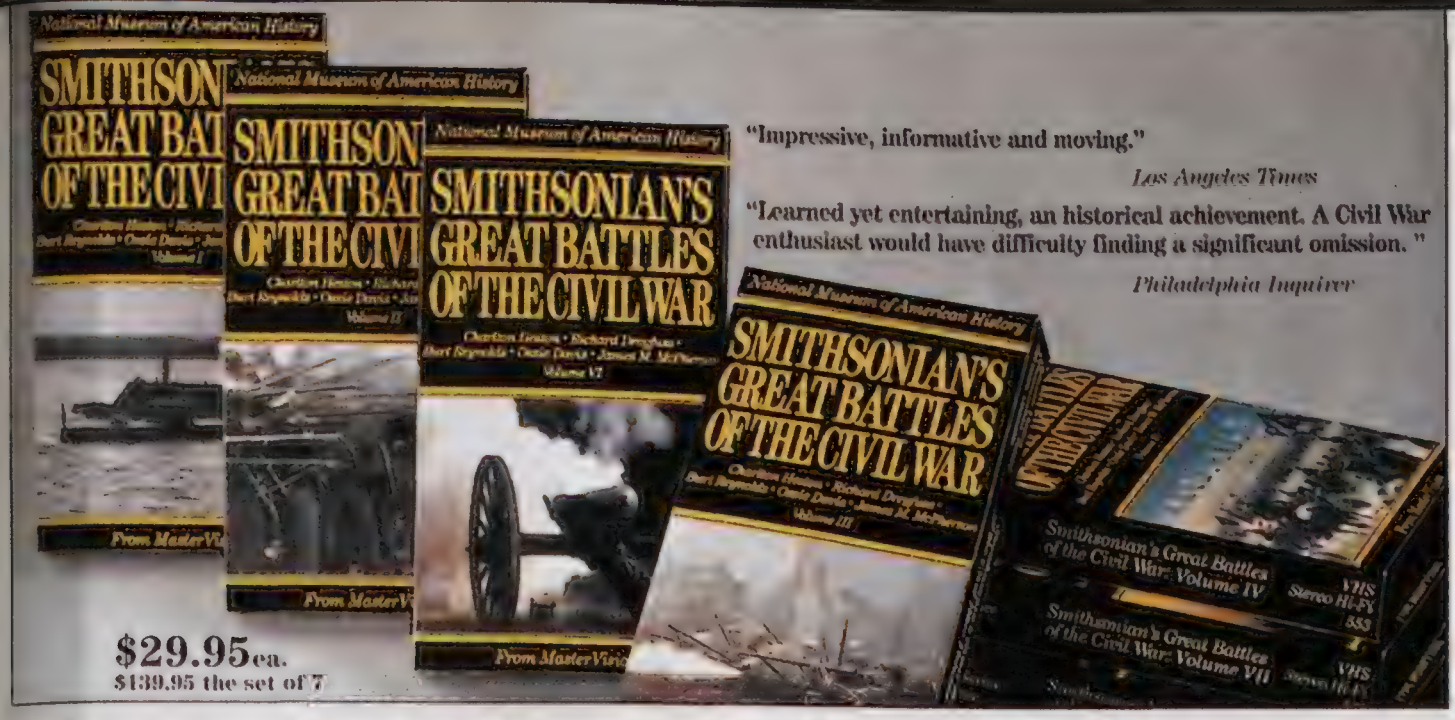
Born into laser-scannable swaddling clothes, Baby Garcia Corona will in time shop and work in an environment ever more radically remade by the bar code. If she's late for the office, she won't need to fumble for her ID; a radio-frequency badge somewhere in her purse will produce a copy of her photo ID on the guard's terminal. Via a constellation of radio-frequency tags deployed on her windshield, she will not only glide through every tollbooth from New York to Miami, but will also fill up on gas and drive-through fast food without once digging into her wallet. Back home, she might slide the bar code on her frozen potpie past the scanner on her microwave oven, which will download the proper cooking and temperature settings from a nationwide database. If that potpie has become part of a product recall, her oven—bells ringing and LCD flashing—could alert her to the hazard.

What she gains in speed and efficency, however, she will lose in privacy. To save 30 cents on a jar of pickles, Garcia Corona will have to present her supermarket club card at the register, divulging all her purchases to the grocer's database. Her personal file—including a preference for too much hamburger and too little fish, too much soda and not enough fruit juice—could then be sold to a health insurer contemplating her as a policy risk. Her chain bookstore will record for posterity every book or magazine she buys there; her CD outlet will know her penchant for Mozart or acid rock. These customer databases, and a hundred others, will harbor potentially rich veins of information that could be tapped by direct-mail houses, telephone solicitors or even a persistent prosecutor.

But none of these coming intrusions are palpable as Christine Corona navigates her way through Target, scanning bibs and bottles for her baby. In fact, she is grateful for the seeming freedom of self-registration. She's glad that no Target clerk is padding at her heels, eavesdropping on her personal conversation, trying to direct her attention to an elaborate stroller or a particularly gaudy rattle.

The bar code appears to liberate the expectant mother from all this meddling, just as it has transported her to a realm of such speed and self-sufficiency that she remains an island of consumer calm within the chaos of this overcrowded megastore. "You don't feel like they're watching over you," Corona says. "They give me the gun. They tell me to go, and they let me be free."

Los Angeles-based freelancer Ed Leibowitz is working on a book about the bar code.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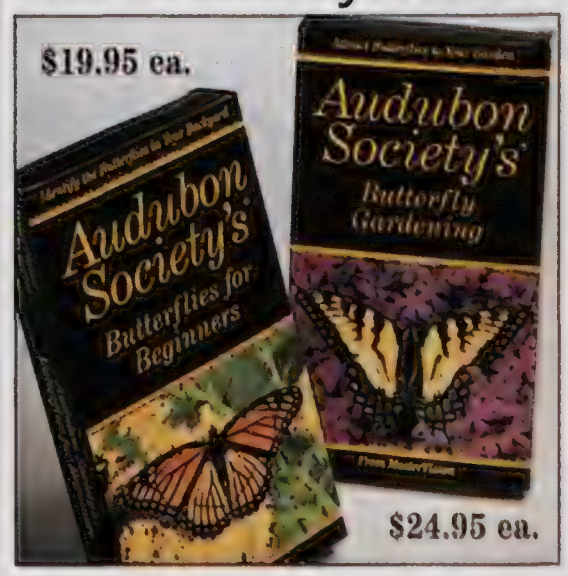

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"SOMETHING THERE IS THAT DOESN'T love a wall," wrote Robert Frost, questioning the yearly rite of fence mending between New England neighbors. Author John Hanson Mitchell questions more than the wall; he wonders about the very concept that divides land into parcels of private property. "Who really owns any land for that matter?" he asks. "How do you determine where the boundaries lie exactly while you are out walking, and if you happen to cross an imaginary line, one run out and recorded and set on paper and filed in a registry of deeds, what does it matter?"

In *Trespassing*, Mitchell takes us with him across those imaginary lines, as he wanders over his neighbors' farms and fields, evoking a New England of Puritans and the Indians they dispossessed, and the generations of Yankee farmers who followed and who are now selling the land to rapacious developers.

Mitchell's trespasses are focused on a particular Massachusetts landscape, a 16-square-mile tract near present-day Concord, that the Puritans called the Nashobah Plantation and which their General Court in 1654 "granted" to a group of Pawtucket Indians who professed Christianity and settled there. A missionary named John Eliot, supported from London by the Society for the Propagation of the Gospel Among the Poor Blind Indians of New England, converted these "praying Indians," but neither faith nor property protected them when the Puritans clashed with other New England tribes in 1675. Rousted from Nashobah, they were incarcerated on a wintry island in Boston Harbor, where many died. Those who returned to Nashobah eventually saw much of their land taken over by Puritan farmers. In 1736 their last survivor, a woman who was known as Sarah Doublet, signed away the last acres of the Nashobah tract to a family of tavern owners in exchange for a comfortable deathbed.

Mitchell walks in Sarah Doublet's footsteps, pondering the changing concepts of use and ownership that have shaped this stretch of land. Among the Indians, different groups had rights to use land for certain purposes, for farming, fishing or hunting, and at certain times of the year. So more than one group might have some rights to the same land. But no one owned it, and no one had the right to destroy it.

The Puritans arrived with a concept of property that included provisions for common as well as individual lots, and for the practice of surrounding villages with greens or grazing areas that required shared work, decision-making and use. In this arrangement, there was little room for land speculation.

In the Southern colonies, however, land was apportioned in larger, individually owned tracts, a system that allowed for land speculation. This option proved a common means of amassing a fortune. As the English colonists moved West, it was the

"Who really owns any land?" Hanson asks. "How do you determine where the boundaries lie while you are out walking?"

Southern system that prevailed. "Wilderness, in the biblical sense, came to an end in America on May 20, 1785," writes Mitchell. "On that day Congress authorized the survey of the Western Territories and divided the continent into a system of six-mile-square townships. Each township was to be organized by straight lines running due north and south, and due east and west. Within this boundary, there was a further division . . . into thirty-six square sections, each amounting to 640 acres."

Mitchell sees this act as the seed of destruction that is now flowering in our landscape of subdivisions and strip malls, endangered species and toxic environments. "The national grid was essentially the ultimate expression of private property," he writes, "a way of laying out the whole continent into identifiable, salable lots . . . which viewed land not as a place of wildness and beauty or a source of sustenance, but above all as a commodity to be bought and sold primarily for capital gain."

In his own neck of the woods, Mitchell describes how his neighbors are protesting and in some cases blocking the plans of developers to subdivide further the remaining open spaces, to plant expensive "trophy houses" where orchards and hayfields had been. He recounts the community meetings, petitions and public hearings that finally halted one development on the land of the old Nashobah Plantation, and convinced the town to buy the tract and turn it back into communal open space, bringing that piece of property full circle since Sarah Doublet's day.

Mitchell examines the ways private property is being restored to common use, through such means as conservation easements, land trusts and greenbelts, and notes a growing change in the American attitude toward land. More than a century ago, when Congress passed the Dawes Act designed to convert Indian land from common to private property, as a way to civilize the tribes, a government official stated, "The common field is the seat of barbarism."

Today, Mitchell and many others would place the seat of barbarism not in the commons but in the endless spread of subdivisions and the proliferation of outlying commercial strips "where the greediest can, with abandon, erect the largest signs, serve the fastest foods, and offer the most convenient parking."

There is another story of communal responsibility for the land in America, which Mitchell mentions only briefly, but which José Rivera explores in his study of the traditional Hispanic villages of Colorado and New Mexico. Rivera's *Acequia Culture* describes the small farmers who depend on community irrigation ditches, or acequias. These farmers share the water, work and governing of the ditches, in a way of life that has survived since Spanish soldiers and settlers made their way up the Rio Grande.

Rivera, an associate professor of public administration at the University of New Mexico, spent 12 years working on this book, getting his feet wet with the ditch bosses and irrigators as well as dusting off documents in state and colonial archives. His writing can be somewhat academic, but the story he tells is alive with people who love the land, and are ready to fight for it. Here is the stuff of *The Milagro Beanfield War*, only more real than the conflict over land and water that was posed in John Nichols' novel and Robert Redford's film.

For these small farmers and ranchers, although they own their land as private property, the water is a commons, and without it their way of life would die. "Water is life" is their rallying cry against the forces of urban growth and rural development competing for that water. The demands of industry, agribusiness, recreation and new subdivisions are joined against their traditional water rights. Yet community ditch associations have so far preserved most of their acequias and villages against the rising price of land, threats of urban annexation, government plans to control the water through new regulatory bodies or engineering projects, and revisions

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of law that would allow the sale of water rights as a commodity, separate from the land.

In documenting the grassroots democracy of the ditch associations, and their tradition of shared, sustainable use of a scarce resource, Rivera offers a valuable counterpoint to the story of Mitchell's New England. There, the conservation of open spaces as common land is an amenity for people who no longer live by working the land together. In Rivera's world, life depends on what's shared. As one ditch commissioner puts it, "If there's a cup of water there, we will share it." When a developer tried to buy water rights from members of a ditch association, to use for a new ski area and subdivision, the community protested and a state judge denied the developer's application with these words: "I am persuaded that to transfer water rights, devoted for more than a century to agricultural purposes, in order to construct a playground for those who can pay, is a poor trade, indeed."

Paul Trachtman is based in New Mexico.

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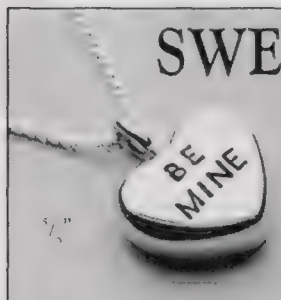

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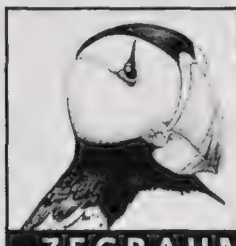
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THE LAST PAGE

Polly Wants a Porter

BY MARGUERITE MUDGE

I was quite astonished to find that most people we knew regarded the baggage allowance as something sacrosanct.

WHENEVER I START OUT ON A trip, there comes to mind the picture of a skinny, embarrassed teenager carrying a birdcage covered with a towel through the cavernous train station in Buffalo. It was my chore to take the birdcage every time my siblings, my mother and I went off on vacation to my uncle's farm.

That there would always be the equivalent of a birdcage in my travels was something I discovered on my honeymoon. In his suitcase my husband, an amateur ornithologist, had packed two pairs of binoculars, a camera, endless film, guidebooks, notebooks, flashlights, batteries. Not many more trips passed before my vanity case was commandeered for extra lenses and camera supplies, and a wardrobe suitcase, left over from train travel, to hold a telescope.

Since the haunts we visited were all in the countryside or on beaches, our trips were great for children. Soon our young son, Alan, and daughter, Tenney, were traveling with us. The children added extra gear: stuffed animals, two more snorkels, flippers, masks and water-ski belts. For traveling, the belts were tied around the outside of the suitcase that held the telescope, making that piece of luggage look like an accident victim.

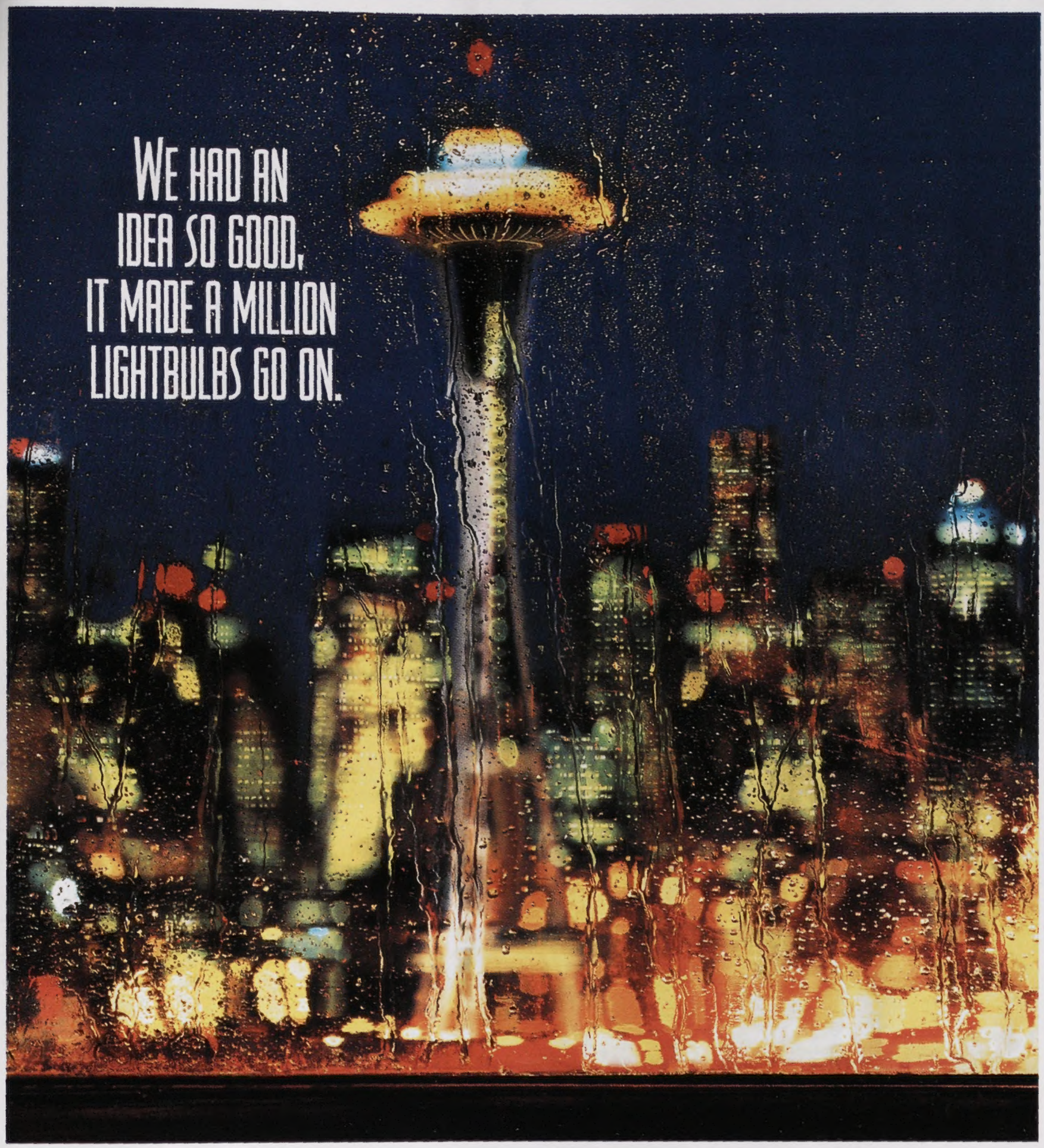
Alan soon became a butterfly-and-beetle expert, and his hobby required nets, more guidebooks, specimen boxes and a black light used for night-flying insects. In East Africa, we also carried a bait can to attract butterflies—with bait made up of overripe bananas, beer and dung, which "improved" with age.

Tenney's travel gear was relatively simple. One notebook listed the animals we saw on daily safaris. Another listed the number of individual species spotted in any one destination. Still another contained extraneous animal records—the names of all the paintings with dogs in them at the National Museum of Fine Art in Oslo, for instance.

That all our gear would exceed the baggage allowance was a fact calmly accepted by my husband. "Just the cost of traveling," he would say.

Having learned over time to travel with this cavalier attitude, I was quite astonished to find that most people we knew regarded the baggage allowance as something sacrosanct. During an island stop on an Indian Ocean cruise, I purchased a souvenir for a fellow passenger who at the last minute had decided to stay aboard that day. When I presented the woman with an envelope holding a single dried vanilla pod, she politely shook her head. "No thank you," she said. "My baggage is already overweight."

After returning from a trip to Saint Vincent in the Caribbean one winter, my husband and I attended a dinner of the Linnean Society at the Museum of Natural History in New York. Before we were seated, I spotted a woman who had stayed at the same island hotel as we and who had helped us load our baggage into the taxi for the ride to the airport. As I approached my friend and the group of people she was talking to, I heard our name mentioned. "Have you ever seen the way the Mudges travel?" she said. The horror in her voice made me stop in my tracks. Suddenly, despite a certain savoir faire acquired through age, experience and much globe-trotting, I was right back in that Buffalo train station, sheepishly carrying a birdcage covered with a towel.



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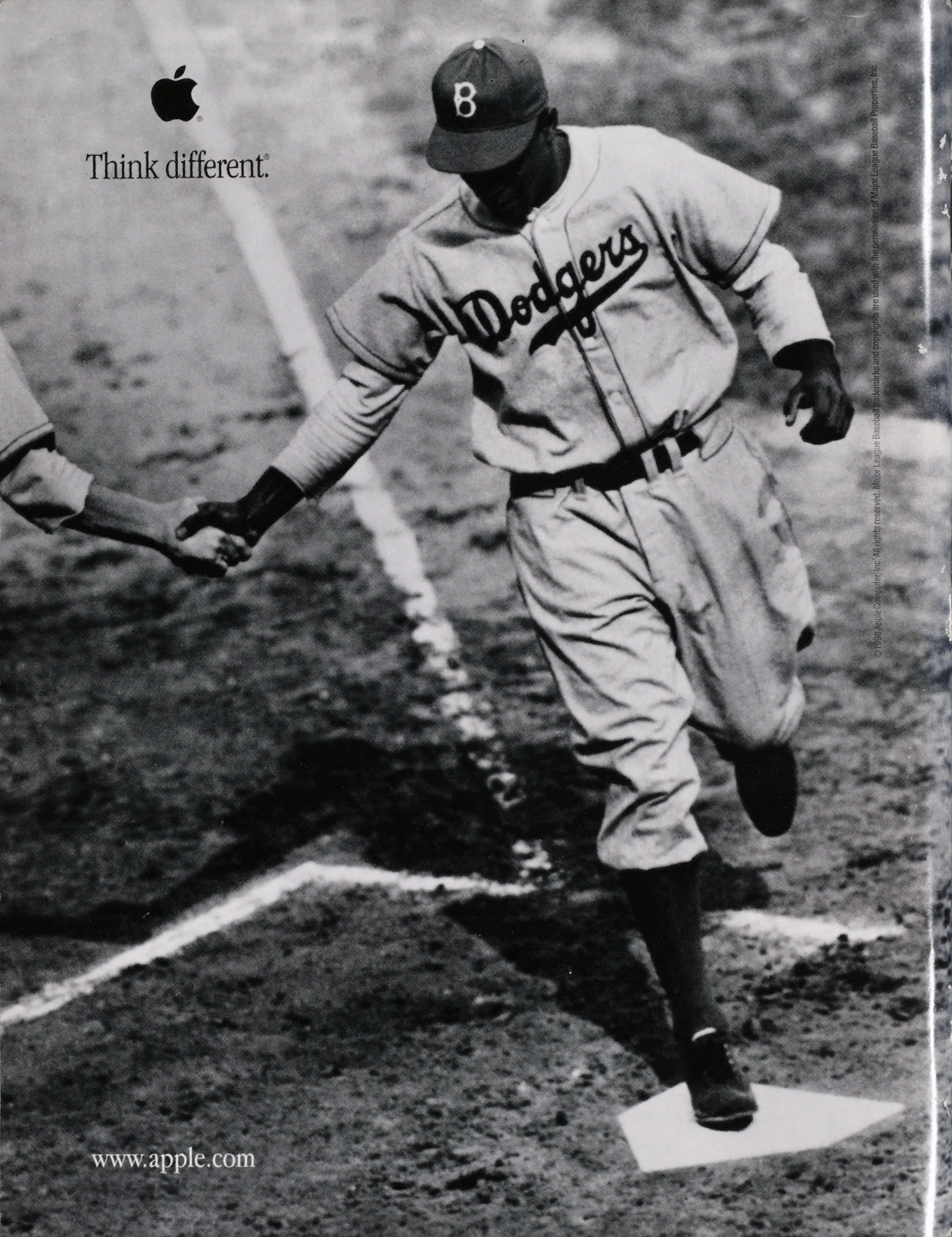

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